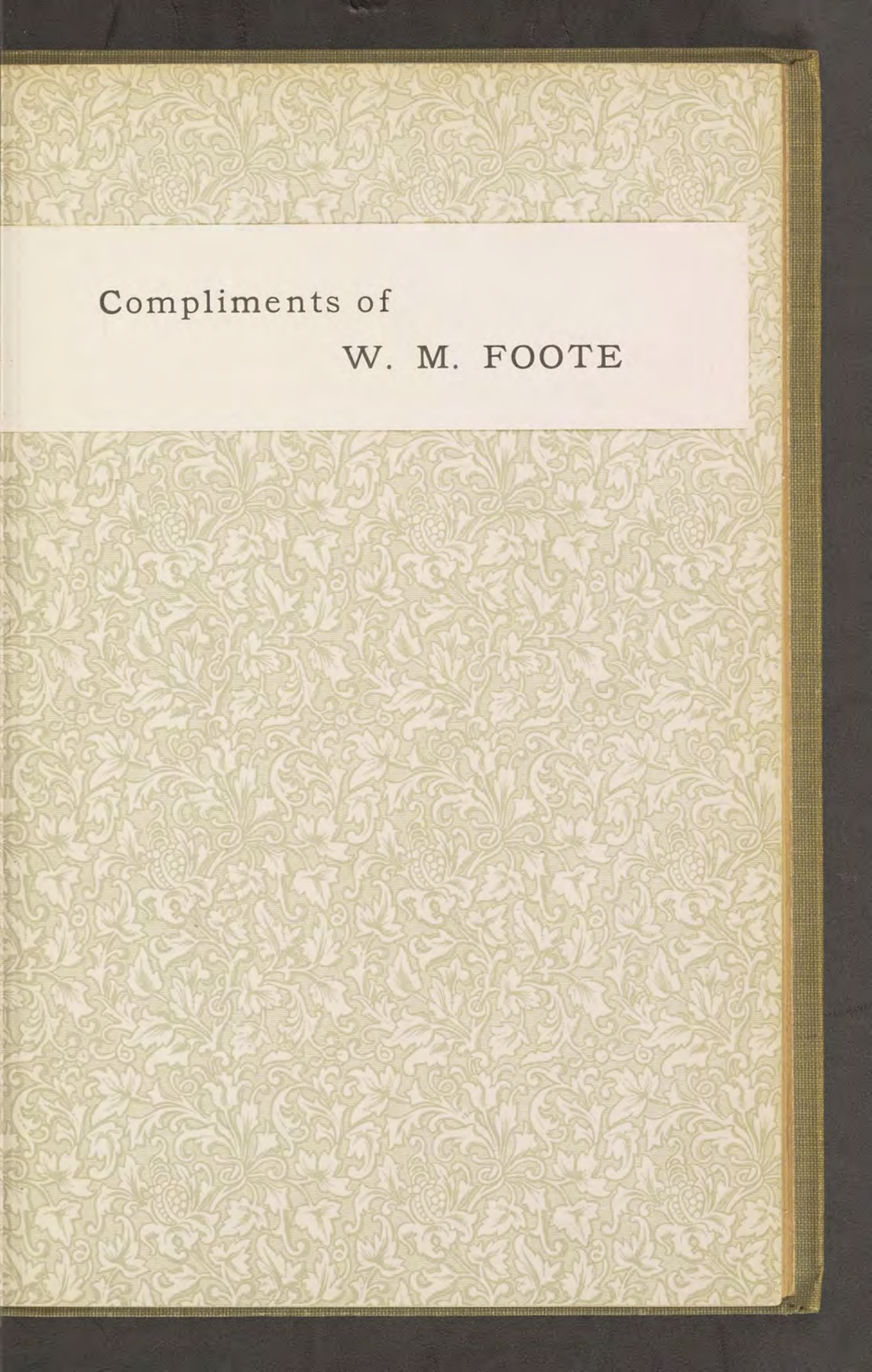


COMPLETE
MINERAL CATALOG
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Nov 1954*

COMPLETE MINERAL CATALOG

Compiled by W. M. Foote

PART I

Mineral Collections and Material for the Laboratory

PART II

Descriptive Account of Choice Specimens. Meteorites.
Price List of Individual Specimens. Classified Table
of Minerals according to Dana's System,
with Index. Metallurgical Classifi-
cation of Minerals

Rare Minerals for Manufacturing Purposes Supplied
in Commercial Quantities

See Page 98

216 Pages, Illustrated

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N o t e .

In this new edition of our catalog of collections, the various lists have been corrected and revised to accord with the latest and most practical educational requirements, and similarly, with the steady growth of our large stock.

Some idea of the increased store of material at hand is given in the enlarged "Complete Type Collection List" of fifteen hundred specimens. Excellent examples of these and several hundred others are offered in sufficient numbers to afford a wide choice. This is three times as extensive as any similar list published, indicating the extent and variety of the largest stock of minerals in the world. An increasing demand has been noted for the most advanced scientific collections down to the smallest elementary sets, and more efficiently than ever is this demand met with the best and most representative material obtainable. We are constantly receiving appreciative and commendatory letters, and take pleasure in referring to leading teachers and curators of mineralogy.

CABINET SPECIMENS are in one department. EDUCATIONAL SPECIMENS (under one dollar each) in another. LOOSE CRYSTALS are carefully described and arranged in separate cases. They are thus easily examined without the hindrance of a mass of unsought-for material.

A marked improvement has been made in the average quality of the specimens used, while the inclusion of numerous valuable minerals by revision of the collections has added materially to their usefulness. The minimum size for good study specimens averages 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.). Collections in smaller sizes are no longer kept in stock. Prepared to order singly, they cost the same as the student's size.

We have discontinued buying of or selling to other general mineral dealers, giving assurance that what we supply is from direct sources. Accessions come largely from our traveling collectors, or correspondents, at the localities. Our free delivery in all countries saves customers paying the profit of a local middleman or broker.

Free Delivery Throughout the World.

On orders over \$20, catalog prices include packing and transportation at our risk, to any address in the world reached by railroad or steamship line.

PRICES are net. No discounts. The "one-price system" wins universal favor.

TERMS are cash with order, but those known to us may pay on delivery. Public institutions pay in conformance with their appropriations.

MONEY REFUNDED on any item promptly returned.

APPROVAL CONSIGNMENTS, valued over \$20, are sent for examination, carriage prepaid, to institutions or responsible individuals. Rejected items to be returned, carriage prepaid.



We received the
Highest Award
and medal given for

COLLECTIONS OF MINERALS

FOR EDUCATIONAL PURPOSES

At Expositions held
in the following cities:

PHILADELPHIA, 1876
CINCINNATI, 1881
NEW ORLEANS, 1884-85
NEW ORLEANS, 1885-86

LOUISVILLE, 1886
LONDON, 1887
PARIS, 1889
PARIS, 1900



DANA
473
Calcium fluoride, isometric.
FLUORITE. Ca F_2
WEARDALE, CO. DURHAM,
ENGLAND.
FOOTE MINERAL CO.

PLATE II.

SAMPLE MUSEUM OR EXHIBITION SIZE SPECIMEN. LABELING AND MOUNTING ON IMPROVED BLOCK.

Museum or Exhibition Size Specimens.

AVERAGING 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.).

Plate III shows the average size of specimens listed by us for private or public museums, for the school or college class room, or for office or laboratory display, where large examples of showy appearance are desired. While intended for glass cases, as shown in Plate IX, they may be conveniently held in smaller space in a drawer cabinet fitted with pasteboard trays, the drawer being 9 cm. deep. In ordering this size it should be mentioned if trays are wanted instead of blocks. Either are supplied free. In preparing collections in the museum size, especial attention is paid to the neat shaping of each individual, and the selection of bright colors and striking crystallizations, wherever this can be done without impairing the representative character of the collection.

OUR IMPROVED BLOCK for mounting specimens is shown in Plate II.

It is made of extra heavy pasteboard, covered with fine white paper, glazed to resist dust. There are marked advantages of this neat and light paper block over the old-fashioned and sombre wooden one. Varnished wood of any color fails to display the average specimen in the highly effective manner secured by a simple white background. The interior of the case may, however, be in natural color. The uniform depth of the mount is: Top, 9 cm. ($3\frac{1}{2}$ in.); base, 13 cm. (5 in.); slanting front, $4\frac{1}{4}$ cm. ($1\frac{5}{8}$ in.). The length is 16 cm. ($6\frac{1}{4}$ in.) and the height $2\frac{1}{4}$ cm. ($\frac{7}{8}$ in.). Wooden blocks substituted without charge, if ordered.

THE MAXIMUM LIMIT of this size is shown by the pasteboard tray in Plate III. 16 x 12 cm. ($6\frac{1}{4}$ x $4\frac{3}{4}$ in.). Many showy specimens are over size, giving the collections as a whole the appearance of being larger than advertised.

THE WEIGHT, packed for shipment, averages 1100 grams (about $2\frac{1}{2}$ lbs.) per specimen. It is about five times as large as the student's size and costs four times as much.

Any desired size can be prepared on order, the price roughly varying with volume, our high standard of quality being always the same. An extra labor cost is, however, incurred in specially prepared sizes.

Student's Size Specimens.

AVERAGING 7 x 5 CM. ($2\frac{3}{4}$ x 2 IN.).

Plate IV shows the average size of the individuals forming our various collections for study. The representative character of the specimens in illustrating physical properties and crystallization is considered of prime importance, but incidentally many of the specimens are of attractive appearance.

DRAWER CABINETS fitted with pasteboard trays offer the best means of keeping the specimens, the drawers being 5 cm. (2 in.) deep. PORTABLE CABINETS are lighter. See next page.

THE MAXIMUM LIMIT of this size is shown by the dimensions of the pasteboard tray. Many specimens reach this limit, the collections thus appearing larger than advertised.

OUR PASTEBOARD TRAYS are admittedly the best. It is impossible, without them, to keep labeled specimens in drawers, except in a state of hopeless disorder and confusion.

To meet this universal need we present with each specimen one of our standard pasteboard trays, covered with white glazed paper, and strengthened with inner linen binding. To display the specimen and label to the best advantage, a simple and effective method is to reverse the tray. (Plate IV.) The outside measurement is 8 x 6 x $1\frac{1}{2}$ cm. (about $3\frac{1}{8}$ x $2\frac{3}{8}$ x $\frac{5}{8}$ in.).

THE WEIGHT, packed for shipment, averages 225 grams (about $\frac{1}{2}$ lb.) for each specimen.

SMALLER SIZES are not kept in stock. Prepared to order, they cost the same as above. However, when a number of small size collections are ordered at the same time, the labor cost is much decreased.

MASSIVE FRAGMENTS are sold by weight. (See Laboratory List.)

If preferred, the student's size specimens may be broken into about a half-dozen $2\frac{1}{2}$ cm. (1 in.) fragments.



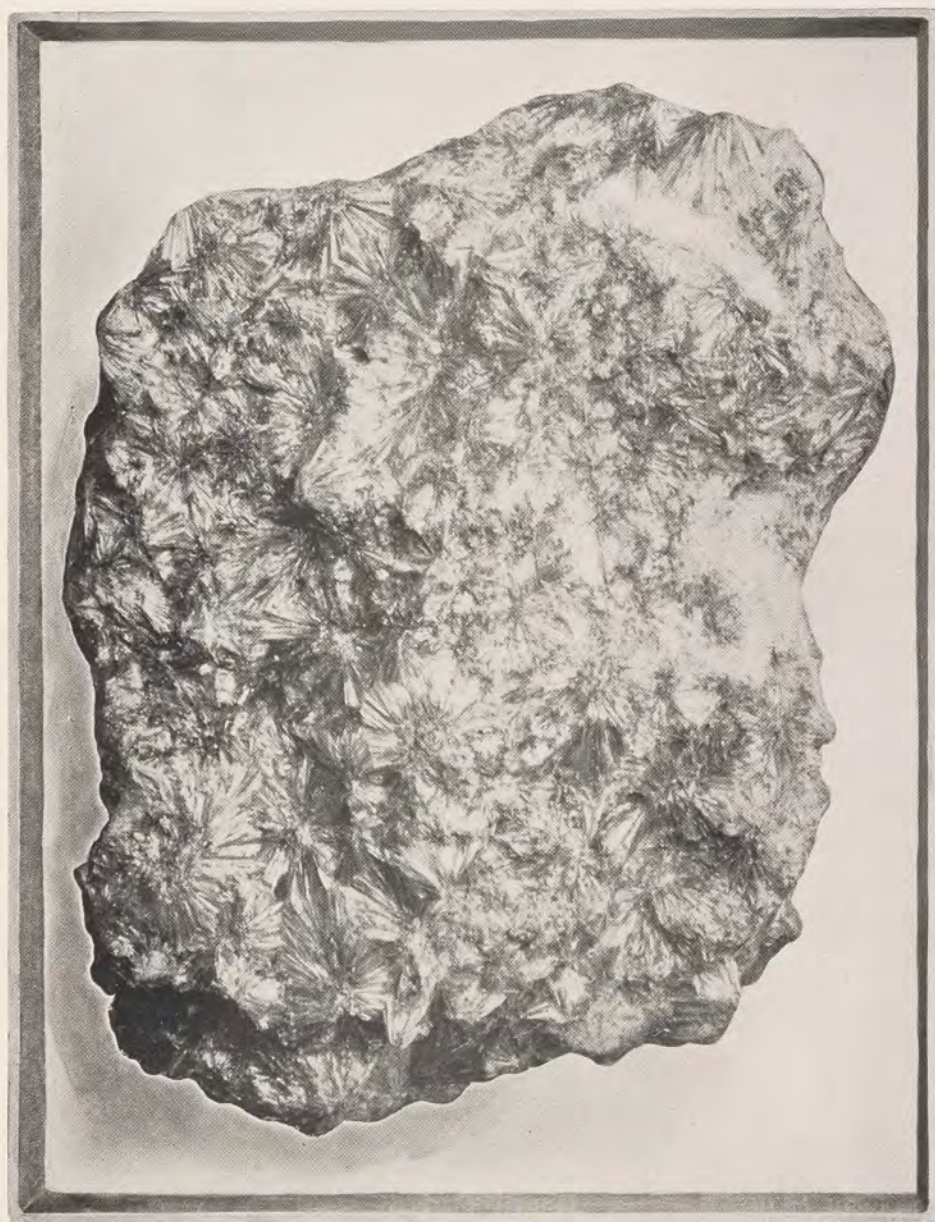


PLATE III.

SAMPLE MUSEUM OR EXHIBITION SIZE SPECIMEN
IN PASTEBOARD TRAY.



PLATE IV.

SAMPLE STUDENT'S SIZE SPECIMEN

IN PASTEBOARD TRAY.

SPECIMEN AND LABEL DISPLAYED ON REVERSED TRAY.

Drawer-Cabinets

When containing collections prices include delivery. If bought separately transportation is at buyer's expense.

The purchaser of a mineral collection finds it impossible to buy ready-made, a cabinet of shallow drawers. To meet this want at a reasonable cost, we have our Mineral Drawer-Cabinets made up in quantities, according to our own latest designs. They are planned to just hold the student's size specimens. A single cabinet made to order would cost more than our price, which includes delivery. A handsome and well-finished quartered oak is used, and the workmanship is of the best, with a view to securing a neat and strong cabinet in as compact a form as possible. Fitted with antique-metal knobs.

The drawers all measure, inside, 56 x 36 x 5 cm. ($21\frac{1}{8}$ x $14\frac{1}{4}$ x 2 in.), and each holds forty-two pasteboard trays measuring 8 x 6 cm. ($3\frac{1}{8}$ x $2\frac{3}{8}$ in.).

(Drawer-Cabinets made to order in mahogany cost one-third more.)

36-DRAWER-CABINET, measuring 130 x 138 x 46 cm. (51 x 54 x 18 in.). See Plate V. For 1500 specimens, \$50.

14-DRAWER-CABINET, measuring 67 x 111 x 46 cm. ($26\frac{1}{2}$ x $43\frac{1}{2}$ x 18 in.). Similar to the one illustrated in Plate VI. Holds about 600 specimens, \$20.

9-DRAWER-CABINET, measuring 65 x 74 x 45 cm. ($25\frac{1}{2}$ x 29 x $17\frac{1}{2}$ in.). Plate VI. Holds about 400 specimens, \$15.

5-DRAWER-CABINET, measuring 65 x 42 x 45 cm. ($25\frac{1}{2}$ x $16\frac{1}{2}$ x $17\frac{1}{2}$ in.). Plate VII. For 210 specimens, \$9.

3-DRAWER-CABINET, measuring 65 x 28 x 45 cm. (25 x 11 x $17\frac{1}{2}$ in.). Plate VIII. For 126 specimens, \$6.

Portable Cabinets

Made extra strong, but light, especially for prospectors or travelers. Same good material, workmanship and finish as the above. Hinged lid and improved metal catches.

200-SPECIMEN-PORTABLE-CABINET. For student's size specimens in pasteboard trays (178—8 x 6 cm. and 22—4 x 6 cm.). One fixed wooden tray in bottom and two removable wooden trays. Weight about 15 kilos (33 lbs.). Measures 78 x 49 x 19 cm. (31 x $19\frac{1}{2}$ x $7\frac{1}{2}$ in.), \$9.

126-SPECIMEN-PORTABLE-CABINET, with one fixed wooden tray in bottom and one removable wooden tray. Weighs about 11 kilos (24 lbs.). Measures 78 x 49 x 13 cm. (31 x 19½ x 5 in.), \$6. See Plate VIII.

60-SPECIMEN-PORTABLE-CABINET. Weighs about 5 kilos (11 lbs.), measuring 74 x 33 x 6½ cm. (29½ x 13¼ x 2½ in.), \$3.

25-SPECIMEN-PORTABLE-CABINET. Weighs about 2 kilos (4½ lbs.), measuring 48 x 33 x 6½ cm. (16½ x 13 x 2½ in.), \$2. See Plate X.

Glass lid instead of wood, in any portable cabinet, \$1.50 extra.

Glass Wall-Cases

For displaying museum-size specimens. Finely finished quartered oak.

1500-SPECIMEN-CASES. Can be made up to order, following any plain design specified, \$500.

600-SPECIMEN-CASES. Same, \$200.

400-SPECIMEN-CASES. Same, \$120.

200-SPECIMEN-CASES. Two cases similar to, but larger than that shown in Plate IX. Each case holding 100-specimens, \$75.

125-SPECIMEN-CASES. Two cases (60 to 65 specimens) like that shown in Plate IX, \$60.

60-SPECIMEN-CASE. Measures 74 x 138 x 36 cm. (29 x 54 x 14 in.), \$30.

25-SPECIMEN-CASE. Measures 112 x 153 x 36 cm. (44 x 60 x 14 in.) See Plate XIII, \$15.

Mineralogy in Mining Schools.

The individual variation in species which is so important a consideration in biological study, is of no less weight to those who would recognize the innumerable forms of the mineral world. The student who has mastered a few hundred specimens may have been warned that they represent but the commoner types. Yet in the field new and unknown varieties confuse and puzzle him at every turn.

Practice in the examination of widely varying types means a fuller acquaintance with minerals, as well as increased power of observation.

This idea is incorporated in the curriculum of the mining schools, where a course in mineralogy includes constant drill in the identification of innumerable minerals by sight and by the quick tests applicable in the field.

As complete a collection as possible should be selected. The rarer specimens may not be carefully studied, but will occasionally be invaluable for reference. It is better to risk having too extensive a collection than one which is inadequate.



PLATE V.

THIRTY-SIX-DRAWER CABINET (1500 SPECIMENS).

Containing No. 3A.



PLATE VI.
NINE-DRAWER CABINET (378 SPECIMENS).
Containing Nos. 11A or 24B.

Standard Collections.

A professor of mineralogy at one of the oldest seats of learning in Europe, speaking of an order about to be placed with us, said: "I want good working specimens—I like this Opalized-wood because it shows plainly that it is a petrification, and this Calcite because it does not need a pointer to call attention to its form." That is precisely the aim of our collections. Throughout, they illustrate the subject, a thing which poor or carelessly selected specimens can never accomplish.

Correct labeling is of the highest importance. Selection of specimens and labeling is done under the direct supervision of our experienced mineralogists. As a precaution against the misplacing of labels, the specimens have numbers attached, corresponding to a numbered list. A welcome innovation is the sending of a pasteboard tray with every specimen. This is essential to orderly arrangement. A neatly printed label, giving name, composition, form and locality accompanies each specimen. (See Plate II.)

Substitutions or changes ordered will be charged for at the actual cost of labor involved, and of course extra rarity means increased price. After frequent comparisons it is claimed that our collections are the most economical, because selected with greater care, include a larger number of good crystallizations, are labeled better and present a more attractive appearance than those offered for sale elsewhere. One of the least factors in specimen value is size, yet our publication of average sizes in centimeters and inches is more exact than "good" and "handy." The cataloged collections (except No. 1A) are kept in stock, ready for shipment immediately on receipt of order.

The vast stock from which our collections are selected naturally affords a wide choice of individual specimens for those who prefer to purchase according to their own list. This, however, is not quite so cheap as buying one of the regular cataloged collections, which are economically prepared a number at a time. If you do not find here a collection answering your requirements, send full details, and we will promptly furnish an estimate. If the desired collection is to consist of less than two hundred or three hundred specimens, and is for elementary study, the price list of individual specimens at the end of the catalog will aid in preparing a list.

Advanced Standard Collections.

Systematically Illustrating the Science.

Arranged according to the generally accepted classification of Dana ("System of Mineralogy," last edition, with Appendix), but can be rearranged as purchasers may desire. The specimens are carefully labeled and numbered to correspond to typewritten list.

No. 1A. COMPLETE TYPE COLLECTION.

Fifteen hundred specimens, museum size, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$3000. Glass cases, \$500 extra.

Intended for those desiring a collection, which for study or comparison is fairly complete in the light of present knowledge. Over six hundred distinct species are represented, embracing the most important in Dana's "System." Those omitted are so rare, that they are generally unrepresented in all but the largest museums. Under the commoner species all essential known varieties and types are included, embracing numerous crystal habits, variations of form, structure and color. The multiplication of slight variations or merely local examples is avoided. Otherwise the number of specimens, selected from our extensive stock, might be doubled. The occurrence of the commercial minerals is especially considered worthy of illustration by as many examples as their variations demand. The examples comprising the complete Economic, Crystallographic, Physical and Chemical Series cataloged, all find a place in this general collection. It is only from a stock as comprehensive as ours that such a series of specimens can be selected. New finds permit revision and improvement in the collection from year to year, but the "Complete Type Collection List" which follows, affords an excellent idea of the character of the collection. This or the following collection is preferred by all who appreciate the advantages of a familiarity with the numerous forms in which one mineral is found, and the practical value of the drill in observation which is thus afforded.

No. 3A. Specialist's Complete Type Collection.

Fifteen hundred specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$750. Drawer cabinet, \$50. (Pl. V.) Arranged for experts or advanced students, though serving the purpose of institutions desiring a complete collection at a relatively low price. (Same list as for No. 1A.)

No. 5A. UNIVERSITY COLLECTION.

Six hundred specimens, museum size, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$800. Glass cases, \$200 extra.

The "University List" (names with + or *) aims to include such minerals as are taken up in most university or college courses. All species chemically important and essential in the illustration of a comprehensive and thorough course are represented. Examples are shown of most of the ores and commercial minerals which the miner or prospector may wish to recognize, because of their actual commercial value. The numerous varieties of well-known minerals which are found with the ores are also worthy of representation, although not in themselves valuable.

The list contains over three hundred and fifty distinct species, and a careful elimination of obscure and less essential names has been observed. As outlined, this collection meets the requirements of a purely scientific course, yet is an invaluable aid in the technical and professional work of laboratory or field. The specimens are in every respect equal to those of No. 1A, approximately half being crystallized, and the remainder, typical crystalline or massive examples of minerals rarely or never occurring in good crystals.

No. 7A. Specialist's Collection.

Six hundred specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$200. Drawer cabinet, \$20 extra. Similar to one in Plate VI.

An improvement on a similar collection formerly listed by us at the same price. The present list is that of the "University Collection."

No. 9A. COLLEGE COLLECTION.

Three hundred and sixty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$480. Glass cases, \$120 extra.

The list (which follows 11A) includes only names marked with a cross (+). No effort is spared in the work of abridgment to make this as useful an advanced collection as the limited number of specimens will permit. It includes practically all the minerals, emphasized by heavy type, in Dana's "Text-book of Mineralogy," and contains a much larger percentage of rare species than our old College List. About two-thirds of the specimens are distinct species. As in the larger collections, every care is exercised that the College Collection may be thoroughly illustrative, and serve as a useful adjunct to private study or class work. It makes a splendid display, and includes a large number of very beautiful specimens.

No. 11A. Student's Collection.

Three hundred and sixty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$120. Drawer cabinet, \$15 extra. See Plate VI.

This is arranged according to the revised "College List," and the same care is taken in preparation as with the larger sized collections.

Complete Type Collection, 1500, Entire List
Nos. 1A AND 3A.

University Collection List, 600 Marked + or *
Nos. 5A AND 7A.

College Collection List, 360 Marked +
Nos. 9A AND 11A.

Abbreviations.

cryst'd—crystallized on matrix or in groups.	prism.—prismatic.
cryst'ne—crystalline structure.	pyram.—pyramidal.
crystal—detached crystal.	acic.—acicular.
octah.—octahedral.	tab.—tabular.
dodec.—dodecahedral.	transp.—transparent.
	pol.—polished.

General Classification

of the Advanced Collections according to Dana's "*System of Mineralogy*,"
Last Edition with Appendix.

- I. Native Elements.
 - II. Sulphides, Selenides, Tellurides, Arsenides, Antimonides.
 - III. Sulpho-salts. — Sulpharsenites, Sulphantimonites, Sulphobismuthites.
 - IV. Haloids.—Chlorides, Bromides, Iodides, Fluorides.
 - V. Oxides.
 - VI. Oxygen-salts.
 1. Carbonates.
 2. Silicates, Titanates.
 3. Niobates, Tantalates.
 4. Phosphates, Arsenates, Vanadates, Antimonates, Nitrates.
 5. Borates. Uranates.
 6. Sulphates, Chromates, Tellurates.
 7. Tungstates, Molybdates.
 - VII. Salts of Organic Acids: Oxalates, Mellates, etc.
 - VIII. Hydrocarbon Compounds.
- New Species. From the Supplement and Appendix.

I. Native Elements.

I. Non-Metals.

1+ DIAMOND, crystal, octahedral	7 GRAPHITE, scales, hexagonal
2 " " dodecahedral	8 " earthy
3* " Bort	9+ SULPHUR, cryst'd
4 " Carbonado	10 " " acute pyramidal
5+ GRAPHITE, foliated	11* " crystal, obtuse "
6 " radiated	12 " cryst'd, tabular
	13+ " " sphenoidal
	14 " massive
	15 " encrusting

II. Semi-Metals.

- 16 TELLURIUM, cryst'd
 17* " massive
 18 ARSENIC, cryst'd
 19 " granular
 20+ " reniform
 21* ALLEMONTITE, cryst'ne
 22+ ANTIMONY, granular
 23 " radiated
 24 BISMUTH, cryst'd
 25+ " foliated

III. Metals.

- 26 GOLD, cryst'd, octah.
 27 " " hollow
 28* " crystals, elongated
 29 " cryst'd, filiform
 30 " " spongiform
 31 " disseminated masses
 32 " " plates
 33+ " " grains
 34+ " " microscopically
 35 " nugget
 36 " grains
 37+ " dust
 38* " electrum
 39* SILVER, cryst'd
 40 " " arborescent
 41+ " " filiform
 42+ " disseminated grains
 43 " " masses
 44* " disseminated plates
 45 " coating
 46 COPPER, cryst'd, dodec.
 47 " " tetrahed.
 48 " " twin
 49+ " " arborescent
 50* " " distorted
 51 " " filiform
 52 " plates
 53+ " massive
 54+ " disseminated
 55 " sand
 56+ MERCURY
 57* AMALGAM
 58+ LEAD
 59 PLATINUM, nugget
 60+ " grains
 61+ IRIDOSMINE

- 62* IRON, terrestrial
 63 " meteoric, diamondiferous
 64+ " " cryst'ne, etched
 65 " " Siderolite
 66* " " stone

*II. Sulphides, Selenides, Tellurides, Arsenides, Antimonides.**I. Sulphides, Selenides, Tellurides, of the Semi-Metals.*

- 67 REALGAR, cryst'd
 68+ " massive
 69* ORPIMENT, cryst'd
 70+ " foliated
 71 " reniform
 72* STIBNITE, crystal, prism.
 73 " cryst'd, acicular
 74 " crystal, bent
 75+ " columnar
 76 " granular
 77 BISMUTHINITE, cryst'd, acicular
 78+ " bladed
 79+ TETRADYMIT, cryst'd
 80 " massive
 81 MOLYBDENITE, cryst'd, prism.
 82+ " " tab.
 83* " cleavage, hex.
 84 " disseminated scales
 85 " granular

II. Sulphides, Selenides, Tellurides, Arsenides, Antimonides, of the Metals.

- 86+ DYSCRASITE, cryst'ne
 87 DOMEYKITE, Condurrite
 88* " Stibiodomeykite
 89* WHITNEYITE
 90 CHILENITE, cryst'ne
 91 ARGENTITE, crystal, cubic
 92 " cryst'd, cubo-octah.
 93* " crystal, distorted
 94 " massive
 95 " disseminated
 96 HESSITE, cryst'd
 97* " massive
 98 PETZITE
 99+ GALENA, cryst'd, cubic
 100* " " octah.

101	GALENA, cryst'd, cubo-octah.	152*	COVELLITE
102	" " twin	153	GREENOCKITE, crystal
103	" " reticulated	154+	" coating
104	" " hollow	155*	WURTZITE, cryst'd
105	" crystal, elongated	156	" massive
106+	" cleavage	157	MILLERITE, cryst'd, capillary
107	" fibrous	158	" " acicular
108+	" argentif., granular	159+	" fibrous coating
109	ALTAITE, cryst'ne	160	NICCOLITE, cryst'd
110	CLAUSTHALITE, cryst'ne	161+	" massive
111	NAUMANNITE	162	BREITHAUPTE, cryst'd
112	BERZELIANITE	163	TROILITE
113	LEHRBACHITE	164	PYRRHOTITE, cryst'd, thin tab.
114	ZORGITE	165	" crystal, thick "
115	CROOKESITE	166+	" massive, nickeliferous
116*	CHALCOCITE, Redruthite, cr'd	167	BORNITE, cryst'd
117	" " crystal, twin	168+	" granular, argentif.
118	" massive, granular	169	" compact, iridescent
119+	" compact	170+	LINNÆITE, cryst'd
120	STROMEYERITE	171+	CHALCOPYRITE, " tetrahedral
121*	STERNBERGITE	172	" " parallel
122	ACANTHITE, crystal	173	" " contact twin
123+	SPHALERITE, cryst'd, black	174	" " penet'n "
124+	" " brown	175*	" " hollow
125+	" " ruby blende	176+	" compact
126	" " yellow	177	" granular
127	" crystal, distorted	178	" reniform
128	" " repeated	179+	STANNITE, yellowish
129	" " twin	180	" bluish
130	" " iridescent	181+	PYRITE, cryst'd, cubic
131	" cleavage, dodec.	182*	" " octah.
132	" " transp.	183	" " cubo-octah.
133	" coarse granular	184+	" crystal, pyritohedral
134+	" fine " gray	185	" modified
135+	" fibrous	186*	" " distorted
136	" Schalenblende	187	" " twin
137	" Marmatite, cr'd	188	" cryst'd, disk
138*	" cadmiferous	189*	" " ball
139	METACINNABARITE, cryst'd	190	" " stalactitic
140*	" massive	191	" granular
141	TIEMANNITE, cryst'd	192+	" compact
142*	" massive	193+	" alt. to Limonite, cryst.
143	ALABANDITE, cryst'd	194*	HAUERITE, crystal, octah.
144*	" massive	195	" " cubo-octah.
145*	PENTLANDITE	196	SMALTITE, cryst'd
146*	CINNABAR, cryst'd, rhombic	197+	" massive
147	" " acicular	198	CHLOANTHITE, cryst'd
148	" " drusy	199+	" massive
149+	" massive	200	COBALTITE, crystals, red-gray
150	" earthy	201+	" cryst'd, tin-white
151	" hepatic	202	GERSDORFFITE, "

203 CORYNITE
 204* ULLMANNITE, cryst'd
 205 " massive
 206* SPERRYLITE, crystals, micro.
 207 SKUTTERUDITE, cryst'd
 208+ MARCASITE, cr'd, "cockscornb"
 209 " " spear
 210 " stalactitic
 211* " globular, radiated
 212* LOLLINGITE, cryst'd
 213 " Leucopyrite
 214 ARSENOPIRYTE, cryst'd
 215+ " " twin
 216+ " massive
 217 " Danaite
 218 SAFFLORITE
 219 RAMMELSBERGITE
 220* GLAUCODOT, crystal
 221 ALLOCLASITE
 222+ SYLVANITE, cryst'd
 223 " " graphic
 224* CALAVERITE, cryst'd
 225 NAGYAGITE, cryst'ne
 226* KERMESITE, cryst'd

III. Sulpho-Salts.

I. Sulpharsenites, Sulphantimonites, etc.

227 LIVINGSTONITE
 228* ZINKENITE, cryst'd
 229 EMPLECTITE, "
 230 GALENOBISMUTHITE, cryst'ne
 231 BERTHIERITE, cryst'd
 232 MIARGYRITE, "
 233 PLAGIONITE, "
 234 BINNITE, "
 235 DUFRENOYSITE, "
 236 COSALITE
 237 JAMESONITE, cryst'd, capillary
 238 " fibrous
 239+ " granular
 240 DIAPHORITE, cryst'd
 241* FREIESLEBENITE, "
 242+ BOURNONITE, "
 243 " crystal, twin
 244+ BOULANGERITE
 245 GUITERMANITE
 246* PYRARGYRITE, cryst'd
 247 " " twin
 248 " compact

249+ PYRARGYRITE, coating
 250 PROUSTITE, cryst'd
 251 " " twin
 252+ " massive
 253+ TETRAHEDRITE, cr'd, tetrahed.
 254 " " twin
 255 " massive
 256+ " argentiferous
 257 " mercurial
 258 " altered to Chalcocopyrite
 259* TENNANTITE, cryst'd
 260* MENEGHINITE, crystals
 261+ STEPHANITE, cryst'd, prism.
 262 " " tab.
 263 " massive
 264 POLYBASITE, crystal, prism.
 265* " cryst'd, tab.
 266 " massive

II. Sulpharsenates, Sulphantimo- nates, etc.

267 ENARGITE, cryst'd
 268+ " massive
 269 FAMATINITE
 270 XANTHOCONITE, cryst'd
 271 ARGYRODITE, "

IV. Haloids.

I. Anhydrous Chlorides, Bromides, Iodides, Fluorides.

272* CALOMEL, cryst'd
 273 NANTOKITE
 274 HALITE, crystal, cubic
 275 " crystals, octah.
 276 " " cubo-octah.
 277* " cryst'd, hollow cubic
 278+ " cleavage
 279* " granular
 280 " banded
 281 SYLVITE, cryst'd
 282+ " massive
 283* SAL-AMMONIAC, cryst'd
 284 CERARGYRITE, "
 285 " compact
 286+ " coating
 287+ EMBOLITE, cryst'd, cubic
 288 " " dodec.
 289 " cryst'ne, spongy
 290* " massive
 291 BROMYRITE, cryst'd

292	IODYRITE, cryst'd	334*	QUARTZ, Rock Crystal, rhombic
293*	" massive	335+	" " " doubly term.
294+	FLUORITE, cryst'd, cubic blue	336	" " " modified
295+	" " " yellow	337	" " " twin
296	" " " green	338	" " " water-worn
297	" crystal, gray, cube	339	" " " capped
298	" cr'd, modified cube	340+	" " " drusy, geode
299*	" " octah.	341	" " " radiated
300	" crystal, pseudo-octah.	342	" asteriated
301	" cryst'd, cubo-octah.	343+	" Amethyst
302	" " tetrahexahedron	344+	" Rose
303	" " dodec.	345	" yellow, Citrine
304	" crystal, twin, lined	346+	" Smoky, light
305+	" pink, octah. cleavage	347+	" Milky
306+	" green, tetrah. "	348	" Sapphire Quartz
307+	" granular, white	349+	" cont. Tourmaline, pol. sec.
308	" altered to Quartz	350	" Cat's-Eye, pol.
309	SELLAITE, cryst'd	351	" Aventurine, "
310	LAWRENCITE	352*	" Ferruginous
311	COTUNNITE	353	" Chloritic, "phantom"
312	TYSONITE	354+	" cont'g liquid, cavernous
313+	CRYOLITE, cryst'd, yellowish		
314	" massive, white		

II. Oxychlorides, Oxyfluorides.

315	MATLOCKITE, cryst'd
316	MENDIPITE, "
317	SCHWARTZEMBERGITE, cryst'd
318	LAURIONITE, cryst'd
319	PERCYLITE, "
320+	ATACAMITE, " acicular
321	" cryst'ne
322	" massive
323	NOCERITE
324	FLUOCERITE
325	BISCHOFITE
326+	CARNALLITE
327*	TACHYDRITE
328	PACHNOLITE, cryst'd
329	THOMSENOLITE, "
330	GEARKSUTITE
331	RALSTONITE, "
332	YTTROECERITE

V. Oxides.

I. Oxides of Silicon.

QUARTZ.

A. Phenocrystalline Varieties.

333+	QUARTZ, Rock Crystal, prism.
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334*	QUARTZ, Rock Crystal, rhombic
335+	" " " doubly term.
336	" " " modified
337	" " " twin
338	" " " water-worn
339	" " " capped
340+	" " " drusy, geode
341	" " " radiated
342	" asteriated
343+	" Amethyst
344+	" Rose
345	" yellow, Citrine
346+	" Smoky, light
347+	" Milky
348	" Sapphire Quartz
349+	" cont. Tourmaline, pol. sec.
350	" Cat's-Eye, pol.
351	" Aventurine, "
352*	" Ferruginous
353	" Chloritic, "phantom"
354+	" cont'g liquid, cavernous

B. Cryptocrystalline Varieties.

355+	QUARTZ, Chalcedony
356	" " " cont'g liquid
357	" Carnelian, pol.
358*	" Chrysoprase, "
359	" Prase, "
360+	" Heliotrope, Bloodstone
361+	" Agate, banded, pol.
362	" Eye-Agate "
363+	" Moss " green "
364+	" Dendritic Agate, gray
365*	" Onyx, pol.
366	" Sardonyx, pol.
367+	" Flint
368	" Hornstone
369	" Basanite (Touchstone)
370+	" Jasper, red
371	" " green
372	" " riband
373+	" " Jasp. Wood, pol.

C. Other Varieties.

374	QUARTZ, granular
375	" Sandstone
376	" Conglomerate
377+	" Itacolumyte, flexible
378	" Buhrstone
379	" pseudomorphous, tab.
380	" " Silic. Wood

381*	TRIDYMIT, cryst'd, tab.	426+	ZINCITE, granular
382	" " twin	427*	MASSICOT
383	Granuline	428	TENORITE, cryst'd
384	Melanophlogite, cryst'd	429*	" massive, Melaconite
385	OPAL, precious, greenish	430+	CORUNDUM, Sapphire, crystal
386+	" " bluish	431	" " " star
387	" " harlequin	432	" Ruby, dark red, "
388+	" " layer	433*	" " light " cleavage
389+	" Fire	434	" gray, crystal
390	" Girasol	435+	" " cleavage
391*	" Common, milky	436	" crystal, twin
392	" " resin	437+	" Emery, granular
393+	" " green	438+	" small crystals, altered
394	" " red	439	HEMATITE, cryst'd, thick, tab.
395	" Hydrophane	440+	" " thin "
396	" Cacholong	441	" " rhombic
397	" Opal-agate	442+	" " modified
398	" Menilite	443	" " twin, Eisenrose
399	" Jasp-opal	444	" crystal, modified
400+	" Wood-opal	445	" " cube-like rhomb
401+	" Hyalite	446	" lamellar
402	" Fiorite	447*	" micaceous
403*	" Geyserite	448+	" columnar, Pencil Ore
404	" Float-stone	449+	" granular
405+	" Tripolite	450	" Kidney Ore
		451	" Jasp. Clay-Iron-Stone
		452+	" Fossil, Red Ochre
		453+	" Martite, cryst'd
		454	ILMENITE, crystal
		455+	" Menaccanite, lamellar
		456*	" " compact
		457	" Washingtonite
		458	" Paracolumbite
		459+	SPINEL, cryst'd, octah., gray
		460	" " " black
		461	" crystal, modified
		462*	" crystals, twins
		463*	" Spinel-Ruby, crystals
		464	" Ceylonite, pebbles
		465	HERCYNITE
		466	GAHNITE, Automalite, cryst'd
		467+	" Dysluite, "
		468*	MAGNETITE, cryst's, octah. mod.
		469+	" cryst'd
		470	" " dodec., striat'd
		471	" octah., parting
		472*	" granular
		473	" Sand
		474+	" Lodestone, compact
		475	" dendritic
		476	" pseudo. Dimagnetite

II. Oxides of the Semi-Metals, etc.

406	ARSENOLITE, cryst'd
407*	SENARMONTITE, cryst'd
408	" crystals
409	VALENTINITE, cryst'd
410*	" stellated
411	BISMITE
412	TELLURITE
413*	MOLYBDITE
414*	CERVANTITE
415	STIBICONITE

III. Oxides of the Metals.

A. Anhydrous Oxides.

416*	CUPRITE, cryst'd, cubic	465	HERCYNITE
417+	" " octah.	466	GAHNITE, Automalite, cryst'd
418	" " dodec.	467+	" Dysluite, "
419	" " modified	468*	MAGNETITE, cryst's, octah. mod.
420+	" Chalcotrichite, capillary	469+	" cryst'd
421+	" massive	470	" " dodec., striat'd
422	" crystals alt. to Malach.	471	" octah., parting
423	PERICLASE, cryst'd	472*	" granular
424	MANGANOSITE	473	" Sand
425	ZINCITE, foliated	474+	" Lodestone, compact
		475	" dendritic
		476	" pseudo. Dimagnetite

477	MAGNESIOFERRITE
478+	FRANKLINITE, cryst'd, octah.
479	" " dodec.
480*	" granular
481	" compact
482	JACOBSITE, cryst'd
483	CHROMITE, crystals
484	" compact
485+	" granular
486+	CHRYSOBERYL, cryst'd
487	" precious
488*	" Alexandrite, crystal
489	" Cat's-Eye, pol.
490	HAUSMANNITE, cryst'd
491*	" massive
492	MINIUM
493	PSEUDOBROOKITE, cryst'd
494+	BRAUNITE, cryst'd
495	" massive

IV. Dioxides.

496	CASSITERITE, cryst'd, acicular	525+	PYROLUSITE, cryst'ne
497+	" " contact twin	526	" columnar
498	" " pentr. "	527	" granular
499	" " repeat'd "		B. Hydrous Oxides.
500*	" massive, brown	528	TURGITE, fibrous
501	" " yellow	529*	" reniform
502+	" disseminated	530+	DIASPORE, cryst'd
503	" Wood Tin	531	" foliated, massive
504+	" Stream Tin, fine	532	GOTHITE, cryst'd, tabular
505	" " coarse	533+	" " acicular
506	POLIANITE	534	" " radiated
507+	RUTILE, red crystals	535*	" columnar
508	" " cr'd, pseudo-rhom.	536	" velvety
509+	" " crystal, twin	537	" Onegite
510	" " acicular crystals	538+	" fibrous, reniform
511	" " reticulated "	539	MANGANITE, cryst'd
512*	" " capillary	540+	" columnar
513	" brown, cryst'd	541*	LIMONITE, compact
514	" Nigrine, crystal, twin	542	" stalactitic
515+	" " cryst'ne	543+	" botryoidal, iridescent
516*	" paramorph—Brookite	544	" ochreous, brown
517	OCTAHEDRITE, bl'k, cryst's, tab.	545+	" " yellow
518+	" " cr'd, pyrm.	546	" Bog Ore
519	" yellow "	547	" Clay-Iron-Stone
520	BROOKITE, cryst'd, tab.	548	" pisolitic
521	" Arkansite, crystal	549	XANTHOSIDERITE
522+	" " cryst'd	550	BAUXITE, red, pisolitic
523*	PYROLUSITE, cryst'd, prism.	551+	" yellowish
524	" " tab.	552	" grayish, earthy
		553+	BRUCITE, cryst'd
		554	" fibrous, Nematite
		555	PYROCHROITE, foliated
		556*	GIBBSITE
		557	HYDROTALCITE
		558	PYROAURITE, cryst'd
		559*	CHALCOPHANITE, "
		560+	PSILOMELANE, massive
		561	" reniform
		562	" stalactitic
		563	LITHIOPHORITE
		564*	WAD (A) Bog Manganese
		565*	" (B) Asbolite, cobaltif.
		566	" (C) Lampadite, cupre's

VI. Oxygen-Salts.

I. Carbonates.

A. Anhydrous Carbonates.

CALCITE.

Crystallized Varieties.

567 CALCITE, rhombic, obtuse

568	CALCITE, scalenohedral, white	615	DOLOMITE, ferriferous
569	" " "phantom"	616	" alt. to Calamine
570+	" modif. " yellow	617*	ANKERITE, cryst'd
571+	" hexagonal	618	" granular
572+	" " Papierspath	619	MAGNESITE, "
573	" Nail-head Spar	620+	" compact
574*	" modified	621	" ferrif., Breunnerite
575*	" twin, scalenohedral	622	MESITITE, cryst'd
576	" modified twin	623+	SIDERITE, " rhomb.
577	" cleavage " asteriated	624	" " " acute
578+	" Iceland Spar	625	" " " curved
579	" cleavage, red	626*	" " modified
580	" " blue	627	" crystal, twin
581+	" siliceous, acute rhomb.	628	" Sphaerosiderite
582	" " hexag. pyram.	629+	" cleavage
Fibrous and Lamellar Varieties.		630	" granular
583	CALCITE, Satin Spar	631	RHODOCHROSITE, cryst'd
584	" Argentine	632	" drusy
585+	" Marble, white, pol.	633+	" cleavable
586*	" " Siena, yellow, pol.	634*	SMITHSONITE, cryst'd
587	" " black, pol.	635+	" mammillary
588	" " Egyptian, pol.	636	" massive
589*	" " Shell-marble, pol.	637	" cupriferous
590	" " Ruin Marble, "	638	" cadmiferous
591	" " Breccia " "	639	SPHEROCOBALTITE
592	" " Puddingstone, "	640*	ARAGONITE, cry'l, prism, yellow
593+	" Lithographic stone	641*	" cryst'd, acicular, rad.
594+	" Hydraulic Limestone	642	" " " "spire"
595+	" Chalk	643	" " twins, white
596	" Oölite	644+	" crystals " brown
597*	" Pisolite	645	" fibrous
598+	" Stalactite	646+	" coralloidal, Flos-ferri
599	" Stalagmite	647	" Tarnowitzite
600+	" Mexican Onyx, pol.	648	" Mossottite
601	" Onyx, clouded, "	649	" crystal, altered
602*	" Travertine	650	BROMLITE, cryst'd, pseudo-hex.
603+	" Calc Tufa	651+	WITHERITE, " " "
604	" Rock-milk	652	" granular
Varieties Based Upon Composition.		653	STRONTIANITE, cryst'd
605	CALCITE, Strontianocalcite	654+	" columnar
606*	" Ferrocaltite	655	CERUSSITE, cryst'd, tabular
607	" Manganocalcite	656	" " prismatic
Alterations.		657	" " pyramidal
608	CALCITE, altered to Calamine	658+	" " twin
609*	" " Quartz	659+	" " aggregate
610	" Thinolite	660	" " reticulated
611+	DOLOMITE, cryst'd, Pearl Spar	661+	" granular, brown
612	" " curved " "	662*	" compact, gray
613+	" granular massive	663+	BARYTOCALCITE, cryst'd, prism.
614	" compact "	664	PARISITE, cryst'd
		665	BASTNASITE, crystal

- 666+ PHOSGENITE, cryst'd, prism
 667 " " modified
 668 " cryst'ne

B. Acid, Basic and Hydrous Carbonates.

- 669 MALACHITE, cryst'd, acicular
 670+ " " capillary
 671+ " massive
 672 " incrusting
 673 " botryoidal
 674 " velvety
 675* " banded, pol.
 676 AZURITE, cryst'd, Chessylite
 677* " ball of crystals
 678 " cryst'd, tab.
 679+ " " modified
 680 " " drusy
 681+ " massive
 682* " alt. to Malachite
 683 " " " Copper
 684* AURICHALCITE, cryst'd
 685* HYDROZINCITE
 686 HYDROCERUSSITE, cryst'd
 687 DAWSONITE
 688+ GAY-LUSSITE, cryst'd
 689 LANTHANITE
 690+ TRONA
 691 HYDROMAGNESITE
 692* ZARATITE
 693 BISMUTITE
 694 VOGLITE
 695 Randite

2. Silicates.

A. Anhydrous Silicates.

I. Disilicates, Polysilicates.

- 696 PETALITE, Castorite
 697+ " massive
 698 MILARITE, cryst'd
 699 EUDIDYMITE, crystal
 700* ORTHOCLASE, Adularia, cryst'd
 701 " Valencianite, "
 702* " Sanidine, "
 703 " white, crystal
 704 " yellow, cryst'd
 705+ " reddish, "
 706+ " cleavage
 707+ " Carlsbad twin crystal
 708* " Baveno " "
 709 " Manebach " cryst'd

- 710 ORTHOCLASE, compact red
 711 " Loxoclase
 712 " Necronite
 713 " alt. to Cassiterite
 714 PERTHITE, cleavage
 715 HYALOPHANE, cryst'd
 716 MICROCLINE, grayish, chatoy'nt
 717+ " Amazonstone, crystal
 718 " Chesterlite, cryst'd
 719 ANORTHOCLASE
 720* ALBITE, cryst'd
 721 " massive
 722 " Peristerite
 723 " Aventurine
 724+ " Moonstone
 725+ " Pericline, cryst'd
 726+ " Cleavelandite, lamel.
 727 OLIGOCLASE, cryst'd
 728 " transp., massive
 729+ " Sunstone, cleav.
 730* ANDESINE, cryst'ne
 731+ LABRADORITE, blue, cleav. pol.
 732 " compact
 733* ANORTHITE, crystal, gray
 734+ " cryst'd, white
 735 " massive

II. Metasilicates.

- 736+ LEUCITE, crystal
 737 " cryst'd
 738 POLLUCITE
 739 ENSTATITE, grayish, fibrous
 740+ " Bronzite, cryst'ne
 741 " altered to a steatite
 742+ HYPERSTHENE, cleavage
 743+ PYROXENE, Diopside, cryst'd
 744* " Malacolite, crystal
 745 " Mussite
 746 " Hedenbergite, cryst'd
 747 " Salite, cleavage
 748* " Violan
 749+ " Coccoilite
 750 " Diallage
 751 " Omphacite
 752* " Schefferite, cryst'd
 753 " Jeffersonite, "
 754 " Augite, Leucangite
 755 " " Fassaita
 756+ " " green, cryst'd
 757 " " black, "
 758+ " " " crystals

- 759 PYROXENE, Augite, bl'k, tw'n cr's
 760 ACMITE, cryst'd
 761+ " Aegirite, cryst'd
 762 SPODUMENE, cryst'd
 763+ " cleavage
 764 " Hiddenite, crystal
 765+ JADEITE, dark green
 766 " greenish gray
 767+ WOLLASTONITE, grayish, cryst'd
 768 " pink, manganif. "
 769 PECTOLITE, cryst'd
 770+ " mammillary, radiated
 771 " Manganpectolite
 772 LAVENITE
 773 WOHLERITE, cryst'd
 774* RHODONITE, Paisbergite, cryst'd
 775+ " granular
 776 " compact
 777 " Bustamite
 778+ " Fowlerite
 779 BABINGTONITE, cryst'd
 780+ ANTHOPHYLLITE, radiated
 781 " Gedrite
 782+ AMPHIBOLE, Tremolite, cryst'd
 783 " " columnar
 784 " " fibrous
 785* " " Hexagonite
 786* " Actinolite, cryst'd
 787+ " " columnar
 788 " " radiated
 789 " Nephrite
 790+ " Asbestos, white
 791 " " gray
 792* " Mountain leather
 793 " " wood
 794 " Byssolite
 795 " Uralite
 796 " Richterite, cryst'd
 797 " Breislakite, "
 798* " Edenite, "
 799 " Pargasite, "
 800 " Hornblende, "
 801+ " " crystals
 802+ " " cleavage
 803 " " granular
 804 " " green, cryst.
 805+ GLAUCOPHANE, cryst'ne
 806* RIEBECKITE, cryst'd
 807+ CROCIDOLITE, fibrous
 808 " altered to Quartz, pol.
 809+ ARFVEDSONITE, crystal
 810 ÆNIGMATITE
 811+ BERYL, Emerald, cryst'd
 812+ " " ordinary, crystal
 813 " " massive
 814 " " colorless, cryst'd
 815* " Aquamarine
 816 " " yellow, crystal, transp.
 817 " " massive, opaque
 818* EUDIALYTE, cryst'd
 819 " Eucolite, cryst'd
 820 CATAPLEHITE, crystal
 821 MELANOCERITE
 822 CARYOCERITE, cryst'd
 823 TRITOMITE
 824 LEUCOPHANITE, cryst'd
 825 MELIPHANITE, "
 826 IOLITE, "
 827+ " granular
 828 GANOMALITE, cryst'ne

III. Orthosilicates.

- 829 NEPHELITE, gray, cryst'd
 830+ " " glassy, white, cryst'd
 831 " Elæolite, "
 832+ " " massive
 833 " altered, Gieseckite
 834 " " Liebenereite
 835+ CANCRINITE, yellow
 836 " blue
 837 MICROSOMMITE, cryst'd
 838 SODALITE, cryst'd
 839+ " massive
 840 HAUYNITE, cryst'd
 841 " massive, blue
 842+ " granular, green
 843 NOSELITE, cryst'd
 844 LAZURITE, "
 845+ " massive
 846* HELVITE, cryst'd
 847 DANALITE, "
 848 EULYTITE, "
 849 ZUNYITE, "
 850+ GARNET, Grossularite, cr'd, white
 851 " " " green
 852 " " " yellow
 853 " " cr'd, transl., brown
 854+ " " " opaque
 855 " " " rose-red
 856 " Pyrope, pebbles, transl.
 857+ " Almandite, red, cr'l, dodec.
 858* " " " cr'd, mod.

859	GARNET, Almandite, br'n, cr's	910	ZIRCON, cryst'd, pyramidal
860+	" Spessartite, transp.	911	" " modified
861	" " cryst'd	912*	" " twin
862*	" Andradite, Topazolite, cr'd	913+	" Hyacinth, crystals, mod.
863	" " Demantoid, "	914	" Jargon
864	" " Colophonite	915	" alt., Malakon, cryst'd
865	" " Melanite, "	916	" " Cyrtolite, "
866+	" " Polyadelphite, "	917*	THORITE, crystal
867	" " Yttriferous	918	" massive
868	" Uvarovite, cryst'd	919	" Orangite
869	" altered to Chlorite	920+	DANBURITE, cryst'd
870	SCHORLOMITE	921	" crystals, transp.
871*	MONTICELLITE, cryst'd	922	TOPAZ, cryst'd
872	FORSTERITE	923+	" crystals, colorless
873*	" " Boltonite	924*	" " yellow
874	CHRYSLITE, cryst'd	925	" " blue
875*	" " precious	926	" transparent cleavage
876	" " meteoric	927	" pebbles
877+	" " Olivine, granular	928*	" massive, opaque, gray
878	" " Hyalosiderite	929	" Pycnite
879	FAYALITE	930+	ANDALUSITE, cryst'd
880	KNEBELITE	931*	" Chiasolite, cryst'd
881	TEPHROITE	932+	SILLIMANITE, cryst'd
882	ROEPPERITE	933	" Fibrolite, columnar
883*	WILLEMITE, Troostite, cryst'd	934*	CYANITE, cryst'd, blue
884	" " transparent, "	935+	" bladed, curved
885+	" " green, massive	936	" green
886	" " reddish, "	937	" white
887+	PHENACITE, cryst'd	938+	DATOLITE, " cryst'd
888+	DIOPHASE, "	939	" green, "
889	FRIEDELITE	940	" compact
890	PYROSMALITE, "	941	HOMILITE, cryst'd
891+	MEIONITE, "	942	EUCLASE, crystal, transparent
892+	WERNERITE, "	943	GADOLINITE, cryst'd
893	" " Nuttallite, cryst'd	944*	" massive
894+	" " massive, pink	945	YTTRIALITE
895	" " " yellow	946	ZOISITE, cryst'd, brown
896	" " Glaucolite	947+	" columnar, gray
897	MIZZONITE, Dipyre, cryst'd	948*	" Thulite, pink
898	SARCOLITE, cryst'd	949+	EPIDOTE, cr'd, pale green
899+	MELILITE, "	950	" cr'l, dark " transp.
900	" " Humboldtite, cryst'd	951+	" massive, "
901	GEHLENITE, cryst'd	952	" cryst'd, gray
902	Cacoclasite, "	953*	PIEDMONTITE, cryst'd
903*	VESUVIANITE, crystal, prism.	954	" " cryst'ne
904	" " cryst'd "	955	ALLANITE, cryst'd
905	" " " pyr. & "	956+	" massive
906	" " modified	957	AXINITE, brown, cryst'd
907+	" " columnar	958+	" " " modif.
908	" " Cyprine	959	" yellow, " "
909+	ZIRCON, crystals, prism & pyram.	960*	" " compact

- 961 PREHNITE, distinctly cryst'd
 962 " cryst'd, rounded
 963+ " drusy, mammillary

IV. *Subsilicates.*

- 964 HUMITE, cryst'd
 965+ CHONDRODITE, cryst'd red
 966 " granular, yellow
 967 " altered, gray
 968 CLINOHUMITE, cryst'd
 969* ILVAITE, "
 970 ARDENNITE "
 971 LANGBANITE, "
 972 KENTROLITE, "
 973* MELANOTEKITE, "
 974 BERTRANDITE, "
 975 CALAMINE, " tabular
 976 " " curved
 977+ " " drusy
 978 CARPHOLITE, cryst'd
 979* CERITE
 980 TOURMALINE, black, cr'd, acic.
 981 " black, crystal, prism.
 982 " " cryst'd, modif.
 983+ " " radiated
 984+ " Rubellite, cryst'd
 985 " " crystal, transp.
 986 " Indicolite, cryst'd
 987* " brown, cr'd, modif.
 988 " " " flat
 989 " Achroite, crystals
 990+ " green, transp. "
 991 " multi-colored, cr'l
 992* " columnar, black
 993 DUMORTIERITE, cryst'ne
 994* STAUROLITE, cryst'd, prism.
 995+ " crystals, twin
 996 SAPPHIRINE

B. *Hydrous Silicates.*I. *Zeolite Division.*

- 997 INESITE, fibrous
 998 GANOPHYLLITE
 999 OKENITE
 1000* APOPHYLLITE, cryst'd, pink
 1001 " " pyram.
 1002+ " " prism.
 1003 " " tabular
 1004 " " cube-like
 1005 " " foliated

- 1006 PTILOLITE, cryst'ne
 1007+ HEULANDITE, white, cryst'd
 1008 " red "
 1009 BREWSTERITE, cryst'd
 1010 EPISTILBITE, "
 1011 PHILLIPSITE, cr'd, crucif. twin
 1012+ " " comp'nd "
 1013* " " drusy, glob.
 1014* HARMOTOME, cryst'd
 1015* STILBITE, " tabular
 1016+ " " aggreg. brown
 1017 " crystal, "sheaf"
 1018 " radiated, white
 1019 " foliated, red
 1020 GISMONDITE, cryst'd
 1021 LAUMONTITE, " white
 1022* " " red
 1023+ CHABAZITE, " white
 1024* " cr'd, Acadialite
 1025 " " brown
 1026 " Haydenite, cryst'd
 1027 " Phacolite, flat twin
 1028+ " " lenticular "
 1029 " " composite "
 1030 " Herschellite, globular
 1031+ GMELINITE, rhombic twin
 1032 " hexagonal twin
 1033+ ANALCITE, cryst'd, white
 1034 " " transp.
 1035 " crystal, reddish
 1036 FAUJASITE, cryst'd
 1037 EDINGTONITE, "
 1038+ NATROLITE, " prismatic
 1039* " " capillary
 1040 " " radiated
 1041 " massive, "
 1042+ SCOLECITE, cryst'd
 1043 " radiated
 1044 MESOLITE, cryst'd
 1045* " " globular
 1046 THOMSONITE, cryst'd
 1047+ " globular, white
 1048 " pebbles, red

Appendix to Zeolites.

- 1049 Chlorastrolite
 1050 Zonochlorite

II. *Mica Division.*

- 1051+ MUSCOVITE, crystal, hex. form
 1052* " " rhombic "

1149 BEMENTITE
1150 CARYOPILITE
1151 NEOTOCITE

Appendix to Hydrous Silicates.

1152 Aquacreptite
1153 Picrosmine

Titano-Silicates.

1154+ TITANITE, crystal, black
1155 " " twin, yellow
1156* " cryst'd, twin, green
1157 " Lederite, cryst'd
1158 " Greenovite, "
1159 " cleavage, brown
1160 KEILHAUITE, cryst'd
1161 TSCHIEFFKINITE
1162* ASTROPHYLLITE, cryst'd
1163 JOHNSTRUPITE, "
1164 MOSANDRITE, "
1165* PEROVSKITE, "
1166 DYSANALYTE, cryst'd
1167* " crystals
1168 Hydrotitanite, "

3. Niobates, Tantalates.

1169* PYROCHLORE, cryst'd
1170 KOPPITE, "
1171* MICROLITE, crystals
1172+ FERGUSONITE, cryst'd
1173 SIPYLLITE
1174+ COLUMBITE, cryst'd, striated
1175 " crystals, bright
1176 " massive
1177 TANTALITE, "
1178+ " grains
1179 SKOGBOLITE
1180* YTTROTANTALITE
1181+ SAMARSKITE, cryst'd
1182 ANNERODITE, "
1183 HIELMITE
1184 ÆSCHYNITE
1185 POLYMIGNITE
1186 EUXENITE
1187 POLYCRASE

4. Phosphates, etc.

A. Anhydrous Phosphates, Arsenates, Vanadates, Antimonates.

1188* XENOTIME, cryst'd
1189* MONAZITE, crystal

1190 MONAZITE, Turnerite, cryst'd
1191 " cryst'd
1192+ " sand
1193 BERZELIITE, cryst'd
1194 CARYINITE
1195* PUCHERITE, "
1196+ TRIPHYLLITE
1197+ LITHIOPHILITE
1198* BERYLLONITE, crystal
1199 HERDERITE, "
1200* APATITE, cryst'd, white
1201 " crystal, green, transp.
1202+ " cryst'd "
1203 " " blue
1204+ " crystal, brown
1205* " massive, grayish
1206 " Asparagus stone
1207 " Francolite, cryst'd
1208 " Staffelite
1209+ Phosphatic Nodules
1210 Guano
1211+ PYROMORPHITE, cr'd, green
1212 " cr'd, yellow, rounded
1213* " " brown
1214 " " " moss-like
1215 " alt. to Galena
1216 MIMETITE, cryst'd, yellow
1217 " massive, white
1218+ " Campylite, cr'd, glob.
1219+ Endlichite, cr'd, yellow, "
1220 " " red, prism.
1221* " crystal, multi-color.
1222 " massive
1223+ VANADINITE, cr'd, red, prism.
1224* " " brown, curv.
1225 " crystals, hollow prism
1226 " encrusting, globular
1227 WAGNERITE, cryst'd
1228+ " Kjerulfine, crystal
1229+ TRIPLITE
1230 Graphite
1231 TRIPLOIDITE
1232 SARKINITE, cryst'd
1233 DURANGITE, "
1234+ AMBLYGONITE

B. Acid and Basic Phosphates, Arsenates, etc.

1235 MONETITE
1236+ OLIVENITE, cryst'd
1237 " fibrous

- 1238* LIBETHENITE, cryst'd
 1239* ADAMITE, "
 1240* DESCLOIZITE, "
 1241 " drusy, Cuprodesclowitzite
 1242 BRACKEBUSCHITE
 1243* ERINITE
 1244 PSEUDOMALACHITE
 1245 " Ehlite
 1246* CLINOCLASITE, cryst'd
 1247 DUFRENITE, "
 1248+ " fibrous
 1249+ LAZULITE, cryst'd
 1250 ARSENIOSIDERITE, fibrous
 1251 ALLACTITE
 1252 SYNDELPHITE
 1253 ATELESTITE

C. Hydrous Phosphates, Arsenates, etc.

Normal Division.

- 1254* STRUVITE, crystals
 1255 ROSELITE, cryst'd
 1256 BRANDTITE, cryst'd
 1257 Lavendulan
 1258 VIVIANITE, cryst'd, transp.
 1259+ " " bladed
 1260 " Mullicite
 1261 SYMPLESITE
 1262+ ERYTHRITE, cryst'd
 1263 " foliated
 1264 " earthy, "cobalt bloom"
 1265* ANNABERGITE
 1266* SCORODITE, cryst'd
 1267 STRENGITE
 1268* VARISCITE, "
 1269 " massive
 1270 KONINCKITE

Hydrous Phosphates, etc.

Acid Division.

- 1271* PHARMACOLITE
 1272* NEWBERYITE, cryst'd
 1273 WAPPLERITE

Hydrous Phosphates, etc.

Basic Division.

- 1274* CONICALCITE
 1275 BAYLDONITE
 1276+ EUCHROITE, cryst'd
 1277* TYROLITE, cryst'ne
 1278+ CHALCOPHYLLITE, cryst'ne

- 1279 LUDLAMITE, cryst'd
 1280 WAVELLITE, " green
 1281+ " radiated, globular
 1282 " " stalac., white
 1283+ TURQUOIS, sky-blue
 1284 " green
 1285 " grayish
 1286 LISKEARDITE
 1287 EVANSITE
 1288 Cœruleolactite
 1289* PHARMACOSIDERITE, cryst'd
 1290 CACOXENITE, radiated
 1291 BERAUNITE, cryst'd
 1292* CHILDRENITE, "
 1293 EOPSPHORITE
 1294 MAZAPILITE, crystals
 1295* LIROCONITE, cryst'd
 1296 Henwoodite
 1297 CHALCOSIDERITE, cryst'd
 1298 PLUMBOGUMMITE
 1299+ TORBERNITE, cryst'd
 1300 ZEUNERITE, "
 1301+ AUTUNITE, "
 1302 " foliated
 1303 WALPURGITE, cryst'd
 1304 MIXITE "

Antimonates; also Antimonites, Arsenites.

- 1305* BINDHEIMITE
 1306* NADORITE, cryst'd
 1307* ECDEMITE, " red
 1308 " yellow, Heliophyllite

Nitrates.

- 1309+ SODA NITER
 1310 NITER

5. Borates.

- 1311* SUSSEXITE
 1312* LUDWIGITE, cryst'ne
 1313 PINAKIOLITE, cryst'd
 1314 SZAIBELYITE
 1315 BORACITE, cryst'd cubic form
 1316 " crystals, tetrah. "
 1317+ " massive
 1318 WARWICKITE
 1319 HOWLITE
 1320 LARDERELLITE
 1321 COLEMANITE, cr'd, rhomb-like
 1322+ " " prism. modif.
 1323 " " crystal, pyram.

1324 Priceite
 1325+ BORAX, crystals
 1326+ ULEXITE, cryst'ne
 1327 URANINITE, Broggerite, cr'd
 1328 " Cleveite, "
 1329+ " Pitchblende
 1330* GUMMITE

6. *Sulphates, Chromates, Tellurates.*
 A. *Anhydrous Sulphates, etc.*

1331 MASCAGNITE
 1332* THENARDITE, cryst'd
 1333 " crystals, tabular
 1334 " " twins
 1335 APTHITALITE, cryst'd
 1336+ GLAUBERITE, " prism.
 1337 " crystals, tabular
 1338 BARITE, cryst'd, white, "
 1339+ " " yellow, "
 1340 " crystal, " prism.
 1341 " cryst'd, gray, tabular
 1342 " " blue
 1343+ " crystal, blue, flat
 1344 " cryst'd, red, acic.
 1345 " " colorless
 1346* " crested, white
 1347 " lamellar
 1348+ " granular
 1349 " compact
 1350 " stalactitic, pol.
 1351* " fetid, brown
 1352+ CELESTITE, cryst'd, prism., wh.
 1353 " " modif. bluish
 1354 " crystal, tab., "
 1355 " cryst'd, red
 1356 " fibrous
 1357+ " cleavage, bluish
 1358 ANGLESITE, cryst'd, tab., white
 1359+ " " prism.
 1360 " " pyram.
 1361 " " modif. yellow
 1362 " " drusy
 1363* " massive
 1364 ANHYDRITE, cryst'd
 1365* " cleavage, red
 1366+ " granular, gray
 1367 " " blue
 1368 CROCOITE, crystal, acicular
 1369 " cryst'd, prism.
 1370+ " " rhomb-like

1371 VAUQUELINITE, cryst'd

Sulphates with Chlorides, Carbonates, etc.—In Part Hydrous.

1372 KAINITE
 1373 CONNELLITE, cryst'd
 1374 HANKSITE, crystal, prism.
 1375* " " tab.
 1376+ LEADHILLITE, cryst'd, white
 1377 " crystal, green

B. *Acid and Basic Sulphates.*

1378 LANARKITE, cryst'd
 1379 CALEDONITE, "
 1380+ BROCHANTITE, "
 1381* LINARITE, "
 1382+ MIRABILITE
 1383* KIESERITE
 1384 GYPSUM, Selenite, crystal, yel.
 1385+ " Selenite " prism.
 1386 " " crystals, phantom
 1387* " " " lenticular
 1388 " " cryst'd, long prism.
 1389 " " " flat, red
 1390 " " crystal, cross twin
 1391 " " " swallow-tail "
 1392* " " " lenticular "
 1393 " " cont'g liquid
 1394+ " " cleavage
 1395 " fibrous, coarse
 1396+ " " fine, Satin Spar
 1397 " Plumose
 1398+ " compact, Alabaster
 1399* " granular, reddish
 1400 " scaly, granular
 1401+ EPSOMITE, cryst'd
 1402* GOSLARITE, "
 1403 " massive
 1404 MELANTERITE, cryst'd
 1405+ " fibrous
 1406 " pulverulent
 1407 PISANITE
 1408 BIEBERITE
 1409+ CHALCANTHITE, fibrous
 1410 " massive
 1411 SYNGENITE, cryst'd
 1412 BLÖDITE, "
 1413 PICROMERITE
 1414 POLYHALITE, cleavage
 1415 " fibrous
 1416+ " granular

1417 TSCHERMIGITE
 1418 PICKERINGITE
 1419* HALOTRICHITE
 1420 COQUIMBITE
 1421+ ALUNOGEN
 1422 KROHNKITE
 1423 RÖMERITE

C. Hyd. Sulphates. Basic Division.

1424 LANGITE
 1425 HERRENGRUNDITE, cryst'd
 1426 SERPIERITE, "
 1427+ COPIAPITE
 1428 UTAHITE
 1429 AMARANTITE, "
 1430 FIBROFERRITE
 1431 ALUMINITE
 1432 BOTRYOGEN
 1433 SIDERONATRITE
 1434+ ALUNITE, cryst'd
 1435 " granular
 1436 " compact
 1437 JAROSITE, cryst'd, rhombic
 1438+ " " flat

7. Tungstates, Molybdates.

1439* WOLFRAMITE, crystal, flat
 1440 " cryst'd, prism.
 1441 " cryst'ne, bladed
 1442+ " " lamellar
 1443 " " granular
 1444+ HUBNERITE, " bladed
 1445* SCHEELITE, cryst'd, pyram.
 1446 " " drusy
 1447+ " massive
 1448* STOLZITE, cryst'd, pyram., yel.
 1449 " " tab., red
 1450+ WULFENITE, " " "
 1451 " " octah., red
 1452+ " " tab., yellow
 1453 " " " transp.
 1454 " " prism. yellow

VII. Salts of Organic Acids.

1455 WHEWELLITE, cryst'ne
 1456* MELLITE, crystals

VIII. Hydrocarbon Compounds.

1. Simple Hydrocarbons.

1457 Hatchettite

1458+ Ozocerite
 1459 Pyropissite

2. Oxygenated Hydrocarbons.

1460* Succinite, Amber
 1461 Retinite
 1462 Simetite
 1463 Ambrite
 1464+ Copalite cont'ng insects
 1465 Tasmanite
 1466 Idrialite

Appendix to Hydrocarbons.

1467+ Petroleum
 1468+ Asphaltum
 1469* Elaterite
 1470 Wurtzilite
 1471 Albertite
 1472 Uintahite, Gilsonite
 1473+ Mineral Coal, Anthracite
 1474 " " Bitum., caking
 1475+ " " " non-caking
 1476 " " " Cannel
 1477* " " " brown
 1478 Peat

New Species.

1479 AGUILARITE
 1480* BOLEITE, crystals
 1481* CARNOTITE
 1482* CUMENGEITE, crystal, trilling
 1483* CYLINDRITE, cryst'ne
 1484 ELPIDITE, "
 1485 EPIDIDYMITTE, cryst'd
 1486 FRANCKEITE
 1487 GEIKIELITE
 1488 HANCOCKITE, cryst'd
 1489* HARDYSTONITE
 1490 JOSEPHINITE
 1491 KNOPITE, cryst'd
 1492* LAWSONITE, "
 1493 LORANDITE, "
 1494 NASONITE
 1495* NORTHUPITE, crystal
 1496 OFFRETITE, cryst'd
 1497 RASPITE, "
 1498 ROEBLINGITE
 1499* STIBIOTANTALITE
 1500 THALENITE



PLATE VII.
FIVE-DRAWER-CABINET (210 SPECIMENS).
For Nos. 15A, 27B or 111B.



PLATE VIII.
THREE-DRAWER CABINET
126-SPECIMEN-PORTABLE-CABINET
For Nos. 20A, 29B or 119B.

Elementary Standard Collections.

The arrangement, apart from the silicates, is according to the metallic constituents. Intended to accompany a short course in any popular text-book for beginners.

All specimens are correctly labeled with printed label, giving name, chemical composition, crystallization and locality, as shown in Plate II. The specimens are in every way as good—in fact, are exact duplicates of those in the more expensive advanced collections.

No. 13A. NORMAL OR HIGH-SCHOOL COLLECTION.

One hundred and eighty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$144. Glass cases, \$75 extra.

Prepared especially to meet the demand among Normal and High Schools and private Academies for a collection, embracing only the common or important species and varieties. The striking colors and choice crystallizations, in which the collection abounds, make it, when properly cased, an attractive and invaluable ornament for the class room or school museum. According to the High School List. Contains a much larger number of expensive specimens than our old Collection No. 13. This revised list includes every name in Dana's summary of species.

No. 15A. Student's Collection.

One hundred and eighty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$36. Cabinet, \$9 extra.

Same list as the preceding, but smaller sized specimens, making a desirable collection for those wishing to economize space and funds.

No. 18A. SECONDARY SCHOOL COLLECTION.

One hundred and twenty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$80. Glass cases, \$50 extra.

An abridgment of No. 13A, arranged for schools desiring to cut down the specimens to the minimum number required in a brief course. Except in point of size, it presents nearly the same attractive and showy appearance as the foregoing, and forms an excellent nucleus about which may be conveniently gathered other important minerals. The Secondary School List is exactly as recommended by Prof. E. S. Dana.

No. 20A. Pupil's Collection.

One hundred and twenty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$20. Cabinet, \$6 extra. Same as the preceding, in smaller specimens. Put up in nice typical specimens of student's size.

No. 21A. PRIMARY COLLECTION.

Sixty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40. Glass case, \$20 extra.

This limited selection is not intended for serious study, but more to interest children, by the beauty of form and color of the specimens and the utility of a few of the popularly known kinds. Excellent for illustrating nature-study talks in kindergartens and primary schools. According to Primary School List.

No. 22A. Child's Collection.

Sixty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10. Cabinet, \$3 extra. Same as preceding but smaller sized specimens.

The High School List, 180, Entire List

Nos. 13A AND 15A.

Includes all minerals noted in the summarized list of species in Dana's "Minerals and How to Study Them." (Pp. 161-6.)

The Secondary School List, 120 Marked * or +

Nos. 18A AND 20A.

These minerals are recommended in the Appendix of the above book as the most important for the young mineralogist to have in his collection.

The Primary School List, 60 Marked +

Nos. 21A AND 22A.

Forms the final abridgment suggested for a minimum number of specimens.

The Elementary Economic List

Nos. 29A AND 29B.

Includes one hundred and twenty names, numbered from 1 to 120 consecutively. It omits the silicons and silicates.

Carbon.

- 1 DIAMOND, crystal
2+ GRAPHITE, foliated

Sulphur.

- 3+ SULPHUR, native, cryst'd

Arsenic.

- 4 ARSENIC, native
5 REALGAR, monosulphide, red
6* ORPIMENT, trisulphide, yellow

Antimony.

- 7 ANTIMONY, native, cryst'ne
8+ STIBNITE, sulphide “

Bismuth.

- 9 BISMUTH, native, cryst'ne

Molybdenum.

- 10* MOLYBDENITE, sulphide, cryst'd

Gold.

- 11+ GOLD, native, in Quartz
12 SYLVANITE, telluride

Platinum.

- 13 PLATINUM, native

Silver.

- 14+ SILVER, native
15 ARGENTITE, sulphide, Glance
16 PYRARGYRITE, sulph-antimonite, dark Ruby Silver
17 PROUSTITE, sulph-antimonite, light Ruby Silver
18* CERARGYRITE, chloride

Mercury.

- 19 MERCURY, native
20+ CINNABAR, sulphide, crimson

Copper.

- 21+ COPPER, native
22* CHALCOCITE, sulphide
23* BORNITE, sulphide, iridescent
24+ CHALCOPYRITE, sulphide, yel.
25+ TETRAHEDRITE, sulphantim.
26+ CUPRITE, oxide, cryst'd, red
27+ MALACHITE, carbonate, green
28+ AZURITE, carbonate, blue, cr'd
29 DIOPTASE, silicate, deep green
30 CHRYSOCOLLA, “ light “
31 ATACAMITE, chloride

Lead.

- 32 LEAD, native
33+ GALENA, sulphide, cryst'ne, cubic cleavage
34 JAMESONITE, sulphide
35 BOURNONITE, “
36+ PYROMORPHITE, phosp.cryst'd.
37* MIMETITE, arsenate, yel., cr'd
38* VANADINITE, vanadate, red, “
39 CROCOITE, chromate, red, “
40* WULFENITE, molybdate, yel., “
41+ CERUSSITE, carbonate, cryst'd
42* ANGLSITE, sulphate, “

Tin.

- 43 STANNITE, sulphide
44+ CASSITERITE, Stream Tin, oxid.

Titanium.

- 45* RUTILE, oxide, red crystals
46 OCTAHEDRITE, oxide, cryst'd
47 BROOKITE, “ “
48* TITANITE, silicate “

Radium and Uranium

- 49 URANINITE, varying compos.
50 TORBERNITE, phos. green, cr'd
51 AUTUNITE, “ yellow, “

Iron.

- 52 IRON, native
53+ PYRRHOTITE, sulphide, bronze
54+ PYRITE, sulphide, cryst'd
55 “ “ massive
56+ MARCASITE, “ cryst'd
57+ ARSENOPYRITE, sulph-arsenide
58 HEMATITE, oxide, black, cr'd
59+ “ “ red, massive
60 MAGNETITE, “ cryst'd
61+ “ “ Lodestone
62* FRANKLINITE, oxide
63* CHROMITE, chromate
64+ LIMONITE, oxide, brown
65+ SIDERITE, carbonate

Nickel.

- 66 GENTHITE, silicate
67* GARNIERITE, “ green
68+ MILLERITE, sulph. cryst'ne
69* NICCOLITE, arsenide

Cobalt.

- 70 LINNÆITE, sulphide
 71 SMALTITE, arsenide
 72 COBALTITE, sulph-arsenide
 73 ERYTHRITE, arsenate, red

Niobium.

- 74* COLUMBITE, iron niobate

Tungsten.

- 75 WOLFRAMITE, iron tungstate
 76 SCHEELITE, calcium "

Lithium.

- 77 TRIPHYLITE, phosphate
 78 AMBLYGONITE, fluo-phosphate
 79* LEPIDOLITE, silicate

Manganese.

- 80* PYROLUSITE, oxide
 81* MANGANITE, "
 82+ RHODONITE, silicate, pink
 83* RHODOCHROSITE, carb., pink

Zinc.

- 84+ SPHALERITE, sulphide, cryst'd
 85* ZINCITE, oxide, red
 86* WILLEMITE, silicate, green
 87* CALAMINE, " cryst'd
 88+ SMITHSONITE, carbonate

Aluminum.

- 89+ CORUNDUM, oxide, cryst'd
 90 BAUXITE, hydrous oxide
 91* SPINEL, " " cryst'd
 92* CRYOLITE, fluoride
 93 TURQUOIS, phosphate, blue
 94* WAVELLITE, " green

Calcium.

- 95+ FLUORITE, fluoride, gr'n, cleav.
 96 " " blue, cryst'd
 97* CALCITE, carbonate, cryst'd
 98+ " " Iceland Spar
 99+ " " Marble, polished
 100* " " Stalactite
 101* " " Mex. Onyx. pol.
 102 " " Calc Tufa
 103+ ARAGONITE, " twin crystals
 104+ APATITE, phosphate, cryst'd

- 105+ GYPSUM, hydrous sulphate,
 Selenite, cleavage

- 106 GYPSUM, hyd. sulp. Alabaster
 107* ANHYDRITE, sulphate

Magnesium.

- 108* BRUCITE, hydrate
 109 MAGNESITE, carbonate
 110+ DOLOMITE, " Pearl Spar
 111 BORACITE, chloride

Barium.

- 112+ BARITE, sulphate, crystal
 113* WITHERITE, carb., cryst'd

Strontium.

- 114+ CELESTITE, sulph., blue cleav.
 115* STRONTIANITE, carbonate

Sodium.

- 116+ HALITE, chloride, transparent
 cleavage
 117 BORAX, crystal

Potassium.

- 118 SYLVITE, chloride

Rare Elements.

- 119* ZIRCON, Zr. silicate, crystals.
 120 MONAZITE SAND, thoria, etc.

Silicon.

- 121+ QUARTZ, var. Rock Crystal
 122* " " Smoky, crystal
 123* " " Amethyst, cryst'd
 124* " " Chalcedony
 125* " " Agate
 126+ " " Flint
 127* " " Jasp'd Wood
 128+ OPAL var. Precious
 129+ " " Fire, red
 130 " " Wood-opal, grained

Silicates—The Feldspars.

- 131+ ORTHOCLASE, crystal
 132* " " cleavage
 133 MICROCLINE, var. Amazon-
 stone, green crystal
 134+ ALBITE, lamellar
 135 ANORTHITE
 136* OLIGOCLASE
 137* LABRADORITE, chatoyant

Silicates—Various.

- 138* PYROXENE, var. Diopside, cr'l
 139 " " Salite
 140* " var. Coccoilite, cryst'ne
 141+ " " Augite, cryst'd
 142 ENSTATITE var. Bronzite
 143* SPODUMENE, cleavage
 144 AMPHIBOLE var. Tremolite
 145* " var. Actinolite, green
 146* " " Asbestos, white
 147+ " " Hornblende
 148+ BERYL, green, crystal
 149 GARNET var. Grossularite, cr'd
 150+ " " Almandite, crystal
 151+ MUSCOVITE, white Mica
 152+ BIOTITE, black "
 153 PHLOGOPITE, bronze, Star Mica
 154* CLINOCHLORE, gr'n hydromica
 155* CHRYSOLITE, Olivine
 156* SCAPOLITE, pink
 157* VESUVIANITE, cryst'ne
 158+ EPIDOTE, cryst'd
 159* ZOISITE, cryst'ne

- 160* TOURMALINE, rad., black, cr'd
 161 " Rubellite, "
 162* TOPAZ, gem crystals
 163* ANDALUSITE, crystal
 164* CYANITE, blue, bladed
 165 SILLIMANITE, cryst'd
 166 PYROPHYLLITE, radiated
 167+ STAUROLITE, twin crystals
 168+ TALC var. Steatite
 169+ SERPENTINE, polished
 170 " Chrysotile, fibrous
 171* DATOLITE, cryst'd
 172+ PREHNITE, green
 173+ APOPHYLLITE, cryst'd
 174* PECTOLITE

Silicates—The Zeolites.

- 175 THOMSONITE, globular
 176+ NATROLITE, cryst'd
 177* ANALCITE, "
 178+ CHABAZITE, "
 179+ STILBITE, "
 180* HEULANDITE, "

Secondary School List

Nos. 18A AND 20A.

For a brief description of the following minerals, see the names marked + or * in the preceding list.

- | | | |
|-------------------|-----------------|---------------------|
| 1 GRAPHITE | 20 MIMETITE | 39 MILLERITE |
| 2 SULPHUR | 21 VANADINITE | 40 NICCOLITE |
| 3 ORPIMENT | 22 WULFENITE | 41 COLUMBITE |
| 4 STIBNITE | 23 CERUSSITE | 42 LEPIDOLITE |
| 5 MOLYBDENITE | 24 ANGLESITE | 43 PYROLUSITE |
| 6 GOLD in Quartz | 25 CASSITERITE | 44 MANGANITE |
| 7 SILVER, native | 26 RUTILE | 45 RHODONITE |
| 8 CERARGYRITE | 27 TITANITE | 46 RHODOCHROSITE |
| 9 CINNABAR | 28 PYRRHOTITE | 47 SPHALERITE |
| 10 COPPER, native | 29 PYRITE | 48 ZINCITE |
| 11 CHALCOCITE | 30 MARCASITE | 49 WILLEMITE |
| 12 BORNITE | 31 ARSENOPYRITE | 50 CALAMINE |
| 13 CHALCOPYRITE | 32 HEMATITE | 51 SMITHSONITE |
| 14 TETRAHEDRITE | 33 MAGNETITE | 52 CORUNDUM |
| 15 CUPRITE | 34 FRANKLINITE | 53 SPINEL |
| 16 MALACHITE | 35 CHROMITE | 54 CRYOLITE |
| 17 AZURITE | 36 LIMONITE | 55 WAVELLITE |
| 18 GALENA | 37 SIDERITE | 56 FLUORITE |
| 19 PYROMORPHITE | 38 GARNIERITE | 57 CALCITE, cryst'd |

58	CALCITE, Iceland Spar	79	QUARTZ, Agate	100	CHRYSolITE
59	" Marble	80	" Flint	101	SCAPOLITE
60	" Stalactite	81	" Jasp'd Wood	102	VESUVIANITE
61	" Mex. Onyx	82	OPAL, Precious	103	EPIDOTE
62	" Calc Tufa	83	ORTHOCLASE	104	ZOISITE
63	ARAGONITE	84	ALBITE	105	TOURMALINE
64	APATITE	85	OLIGOCASE	106	TOPAZ
65	GYP SUM	86	LABRADORITE	107	ANDALUSITE
66	ANHYDRITE	87	PYROXENE, Diopside	108	CYANITE
67	BRUCITE	88	" Cocolite	109	STAUROLITE
68	DOLOMITE	89	" Augite	110	TALC
69	BARITE	90	SPODUMENE	111	SERPENTINE
70	WITHERITE	91	AMPHIBOLE Trem'lite	112	DATOLITE
71	CELESTITE	92	" Actinolite	113	PREHNITE
72	STRONTIANITE	93	" Asbestos	114	APOPHYLLITE
73	HALITE	94	" Hornblende	115	PECTOLITE
74	ZIRCON	95	BERYL	116	NATROLITE
75	QUARTZ, Crystal	96	GARNET	117	ANALCITE
76	" Smoky	97	MUSCOVITE	118	CHABAZITE
77	" Amethyst	98	BIOTITE	119	STILBITE
78	" Chalcedony	99	CLINOCHLORE	120	HEULANDITE

Primary School List

Nos. 21A AND 22A.

These specimens are included in the High School List, where they are briefly described and marked +.

1	GRAPHITE	21	HEMATITE	41	QUARTZ, Flint
2	SULPHUR	22	MAGNETITE	42	" Jasp'd Wood
3	STIBNITE	23	LIMONITE	43	OPAL, Precious
4	GOLD, native	24	SIDERITE	44	ORTHOCLASE
5	SILVER	25	MILLERITE	45	ALBITE
6	CINNABAR	26	RHODONITE	46	PYROXENE
7	COPPER	27	SPHALERITE	47	AMPHIBOLE
8	CHALCOPYRITE	28	SMITHSONITE	48	BERYL
9	TETRAHEDRITE	29	CORUNDUM	49	GARNET
10	CUPRITE	30	FLUORITE	50	MUSCOVITE
11	MALACHITE	31	CALCITE, Spar	51	BIOTITE
12	AZURITE	32	" Marble	52	EPIDOTE
13	GALENA	33	ARAGONITE	53	STAUROLITE
14	PYROMORPHITE	34	APATITE	54	TALC
15	CERUSSITE	35	GYP SUM	55	SERPENTINE
16	CASSITERITE	36	DOLOMITE	56	PREHNITE
17	PYRRHOTITE	37	BARITE	57	APOPHYLLITE
18	PYRITE	38	CELESTITE	58	NATROLITE
19	MARCASITE	39	HALITE	59	CHABAZITE
20	ARSENOPYRITE	40	QUARTZ, Crystal	60	STILBITE



PLATE IX.
GLASS CASE (60 SPECIMENS).



PLATE X.

25-SPECIMEN-PORTABLE-CABINET

For Hardness and Fusibility Series and Other Short Collections.

Economic Mineralogy.

SERIES OF ORES FOR MINING SCHOOLS, PROSPECTORS AND EXPERTS.

A long experience in supplying mining schools and similar institutions has brought our facilities up to the highest standard. Great care is exercised in selecting only such examples as are suited to the special requirements of practical work. For comparison and study the material furnished affords typical examples of the ores met with in the field.

The specimens are labeled, as shown in Plate II, with printed labels, giving name, metallic contents and locality. Each specimen has likewise a number attached corresponding to a printed list.

No. 24A. SCHOOL OF MINES COLLECTION.

Four hundred specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$800. Glass cases, \$120 extra.

Designed to illustrate as fully as possible the occurrence of the useful minerals in their varied forms. The more striking differences of crystal habit are included, as well as important variations in quality of ore, structure, color and mode of occurrence. An idea of the varietal representation of species will be gained by referring to the economic minerals included in the Complete Type Collection List.

The School of Mines List includes all mineral species in the Metallurgical List. Others, which are rarer and of less present commercial importance, are added. They are nevertheless of interest in the newer mining regions, where minerals once rare, are often found in marketable quantity. The commoner species are shown in much wider variety than is possible in smaller collections. This series serves the purpose of a high-grade working collection, as well as making an attractive and imposing display.

No. 24B. Mining Expert's Collection.

Four hundred specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$200. Drawer cabinet, \$15 extra.

The same as the preceding, but smaller sized specimens.

No. 27A. MINING COLLECTION.

Two hundred specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$360. Glass cases, \$75 extra.

The demand for a reasonably complete series of metal-bearing minerals is met by this carefully planned collection. As will be seen by referring to the list which follows, no attempt is made to represent varieties of the same mineral, except with the most important species, and then only to show certain striking differences which cannot well be omitted. It contains a large proportion of valuable ores, as well as numerous showy specimens which enliven the collection, making a fine display for the laboratory, class room or museum.

No. 27B. Prospector's Collection.

Two hundred specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$90. Cabinet, \$9 extra.

Smaller size than the preceding. List below.

No. 29A. ELEMENTARY ECONOMIC COLLECTION.

One hundred and twenty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$120. Glass cases, \$50 extra.

This is essentially an abridgment of No. 27A. Most of the gold, silver, radium and thorium minerals are omitted, as well as a majority of the more expensive specimens of other ores, thus greatly reducing the cost. The list is according to Professor Dana, excluding the silicon and silicate minerals. See Elementary Economic List on preceding pages. Properly displayed, it makes a splendid show in a mining office or laboratory.

No. 29B. Beginner's Economic Collection.

One hundred and twenty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$30. Cabinet, Plate VIII, \$6 extra.

Same as preceding, but smaller size.

Metallurgical List.

(ENTIRE LIST FORMS COLLECTION NO. 27A AND 27B.)

Gold, Silver and Platinum Minerals. 9 NAGYAGITE, sulpho-telluride

Nos. 34A and 34B.

Gold (with some Silver).

- | | |
|---|--------------------------------|
| 1 | GOLD, native, grains in Quartz |
| 2 | " " dust |
| 3 | " " nugget |
| 4 | " " electrum, cryst'd |
| 5 | " " in conglomerate |
| 6 | PETZITE, telluride |
| 7 | SYLVANITE, " cryst'd |
| 8 | CALAVERITE, " " |

Silver.

- | | |
|----|----------------------------------|
| 10 | SILVER, native, plates |
| 11 | " " wire |
| 12 | DYSCRASITE, antimonide |
| 13 | ARGENTITE, sulphide |
| 14 | HESSITE, telluride |
| 15 | GALENA, lead sulphide, argentif. |
| 16 | PYRARGYRITE, sulph-antim'nite |
| 17 | PROUSTITE, sulph-arsenite |
| 18 | STEPHANITE, sulph-antimonite |

- 19 POLYBASITE, sulph-antimonite
 20 CERARGYRITE, chloride
 21 EMBOLITE, chloro-bromide
 22 IODYRITE, iodide

Platinum, etc.

- 23 PLATINUM, native
 24 SPERRYLITE, arsenide
 25 IRIDOSMINE, Ir. Os., etc., native

Iron Minerals.

Nos. 37A and 37B.

- 26 IRON, native, meteoric, with Ni
 27 " " terrestrial " "
 28 PYRITE, sulphide, cubic
 29 " " octahedral
 30 " " pyritohedral
 31 " " massive
 32 MARCASITE, " cryst'd
 33 HEMATITE, oxide, cr'd, rhomb.
 34 " " " tabular
 35 " " Pencil Ore
 36 " " Specular "
 37 " " micaceous
 38 " " Oölitic
 39 MARTITE, " cryst'd
 40 MAGNETITE, " "
 41 " " granular
 42 " " Lodestone
 43 GÖTHITE, "
 44 LIMONITE, " brown ore
 45 " " rounded, bl'k
 46 " " Yellow Ochre
 47 SIDERITE, carbonate, cryst'd
 48 " " massive
 49 DUFRENITE, phosphate
 50 MELANTERITE, sulphate

Lead, Antimony, Zinc and Cadmium Minerals.

Nos. 38A and 38B.

Lead.

- 51 GALENA, sulphide, cubic cleav.
 52 JAMESONITE, sulphantimonite
 53 CERUSSITE, carb., white, cr'd
 54 " " brown
 55 PHOSGENITE, chlorocarbonate
 56 WULFENITE, molybdate
 57 PYROMORPHITE, phosph., cr'd
 58 ANGLESITE, sulphate, cryst'd
 59 CROCOITE, chromate, "

Antimony.

- 60 ANTIMONY, native
 61 STIBNITE, sulphide
 62 SENARMONTITE, oxide
 63 CERVANTITE, "
 64 BINDHEIMITE, lead antimonate
 65 NADORITE, lead chlor- "

Zinc.

- 66 SPHALERITE, sulph., Ruby, cr'd
 67 " " " Bl'k Jack, "
 68 ZINCITE, oxide
 69 FRANKLINITE, oxide (Fe & Mn)
 70 SMITHSONITE, carbonate
 71 AURICHALCITE, " (& copper)
 72 HYDROZINCITE, "
 73 WILLEMITE, silic., massive
 74 CALAMINE, silicate, cryst'd

Cadmium.

- 75 GREENOCKITE, sulphide

Copper Minerals.

Nos. 39A and 39B.

- 76 COPPER, native, massive
 77 " " in conglomerate
 78 " " cryst'd
 79 DOMEYKITE, arsenide
 80 CHALCOCITE, sulphide, cryst'd
 81 " " massive
 82 COVELLITE, "
 83 BORNITE, " (and iron)
 84 CHALCOPYRITE, " cr'd (& ")
 85 " " massive "
 86 TETRAHEDRITE, sulphantimonite
 87 ENARGITE, sulpharsenate
 88 ATACAMITE, chloride
 89 CUPRITE, oxide, cryst'd
 90 " " massive
 91 MELACONITE, oxide
 92 MALACHITE, green carb., capil.
 93 " " " pseud.
 94 " " " massive
 95 AZURITE, blue carb., cryst'd
 96 " " " massive
 97 CHRYSOCOLLA, silicate
 98 PSEUDOMALACHITE, phosphate
 99 CLINOCLASITE, arsenate
 100 BROCHANTITE, sulphate

Lithium, Barium, Strontium, Sodium, Potassium, Magnesium, Calcium, Boron and Carbon Minerals.

Nos. 40A and 40B.

Lithium.

- 101 SPODUMENE, silicate (and Al)
 102 LEPIDOLITE, fluo-sil. (& Al & K)
 103 AMBLYGONITE, fluo-phos. (& Al)

Barium.

- 104 WITHERITE, carbonate
 105 BARITE, sulphate, cryst'd
 106 " " massive

Strontium.

- 107 STRONTIANITE, carbonate
 108 CELESTITE, sulphate

Sodium and Potassium.

- 109 HALITE, chloride of sodium
 110 CRYOLITE, fluoride of " Al, etc.
 111 SODA NITRE, nitrate of sodium
 112 SYLVITE, chloride of potassium
 113 POLYHALITE, sulphate of potassium, Ca, Mg, etc.

Calcium, Magnesium and Boron.

- 114 KIESERITE, sulphate of magnes.
 115 CARNALLITE, chloride of magnesium (and K)
 116 MAGNESITE, carb. of magnes.
 117 CALCITE, " " calcium
 118 BORAX, borate of sodium

Carbon.

- 119 DIAMOND, native, crystal
 120 GRAPHITE, " massive
 121 OZOCERITE, hydrocarbon, wax
 122 COPALITE, " resin
 123 PETROLEUM, " oil
 124 ASPHALTUM, " pitch
 125 ANTHRACITE, " coal

Nickel, Cobalt, Chromium, Manganese and Aluminum Minerals.

Nos. 41A and 41B

Nickel.

- 126 NICCOLITE, arsenide
 127 MILLERITE, sulphide
 128 BREITHAUPITE, antimonide

- 129 PYRRHOTITE, sulphide (& iron)
 130 ZARATITE, carbonate
 131 GARNIERITE, silicate
 132 ANNABERGITE, arsenate

Cobalt.

- 133 SMALTITE, arsenide
 134 COBALTITE, sulph-arsenide
 135 ASBOLITE, oxide (and Mn)
 136 ERYTHRITE, arsenate

Chromium.

- 137 CHROMITE, iron chromate

Manganese.

- 138 ALABANDITE, sulphide
 139 PYROLUSITE, oxide
 140 MANGANITE, "
 141 PSILOMELANE, "
 142 WAD, oxide
 143 RHODOCHROSITE, carbonate
 144 RHODONITE, silicate

Aluminum.

- 145 CORUNDUM, oxide, crystal
 146 " oxide, Emery, granular
 147 BAUXITE, "
 148 KAOLINITE, silicate
 149 PYROPHYLLITE, "
 150 ALUNOGEN, sulphate

Rare Element Minerals.

NOTE.—List is revised and new collections prepared as the knowledge of the rare elements advances.

Nos. 42A and 42B.

Radium, Uranium, Thorium and other radio-active elements.

- 151 URANOPHANE, uran., radium, &c.
 152 FERGUSONITE, " " "
 153 YTROTANTALITE, " " "
 154 EUXENITE, " " "
 155 TORBERNITE, " " "
 156 AUTUNITE, " " "
 157 CLEVEITE, " " "
 158 URANINITE, " " "
 159 GUMMITE, " " "
 160 CARNOTITE, " " "
 161 THORITE, thor. metals silic., "
 162 ÆSCHYNITE, " " " "
 163 MONAZITE SAND, thoria, etc.

Yttrium and Cerium metals.

- 164 GADOLINITE, yttr. met., silic., &c.
 165 THALENITE, " " "
 166 SAMARSKITE, " niobate, "
 167 HIELMITE, " tantal., "
 168 XENOTIME, " phosphate
 169 FLUOCERITE, cer. met., fluoride
 170 BASTNASITE, " fluocarb.
 171 ALLANITE, " silic., etc.
 172 CERITE, " " "
 173 MONAZITE cryst., " phosphate
 174 CYRTOLITE, silicate

Zirconium.

- 175 ZIRCON, silicate, crystals

Nos. 43A and 43B.

Tin.

- 176 CASSITERITE, oxide, cryst'd
 177 " " massive
 178 " " Stream Tin
 179 STANNITE, sulphide

Tungsten.

- 180 WOLFRAMITE, iron tungstate
 (and Mn)
 181 HUBNERITE, manganese tung-
 state (and iron)
 182 SCHEELITE, calcium tungstate

Titanium.

- 183 ILMENITE, oxide (and iron)
 184 RUTILE, " red, cryst'd
 185 " " black (& iron)

Molybdenum.

- 186 MOLYBDENITE, sulphide, cryst'd
 187 MOLYBDITE, oxide

Vanadium.

- 188 ENDLICHITE, lead vanadate
 and arsenate, cryst'd
 189 VANADINITE, lead vanad. cr'd

Niobium and Tantalum.

- 190 COLUMBITE, Fe niobate (& Ta)
 191 TANTALITE, " tantalate (& Nb)

Arsenic.

- 192 ARSENIC, native
 193 REALGAR, sulphide, red
 194 ORPIMENT, " yellow
 195 ARSENOPYRITE, iron sul.-arsen.

Mercury.

- 196 MERCURY, native
 197 CINNABAR, sulphide

Bismuth and Selenium.

- 198 BISMUTH, native
 199 BISMUTHINITE, sulphide
 200 GUANAJUATITE, selenide

The following collections accord with the above Metallurgical List. Glass cases to hold twenty-five specimens, 12 x 9 cm., each ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), cost \$15 extra. A flat oak case, with lid, holding twenty-five specimens, 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), \$2 extra. The same for fifty specimens, \$3.

No. 34A. ORES OF GOLD, SILVER, PLATINUM, ETC.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$100.

No. 34B. Ores of Gold, Silver, Platinum, etc.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$25.

No. 37A. ORES OF IRON.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$20.

No. 37B. Ores of Iron.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), \$5.

No. 38A. ORES OF LEAD, ANTIMONY, ZINC AND CADMIUM.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$20.

No. 38B. Ores of Lead, Antimony, Zinc and Cadmium.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$5.

No. 39A. ORES OF COPPER.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$20.

No. 39B. Ores of Copper.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$5.

No. 40A. ORES OF BARIUM, STRONTIUM, SODIUM, POTASSIUM, MAGNESIUM, CALCIUM, BORON AND CARBON.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$20.

No. 40B. Ores of Barium, Strontium, Sodium, Potassium, Magnesium, Calcium, Boron and Carbon.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$5.

No. 41A. ORES OF NICKEL, COBALT, CHROMIUM, MANGANESE AND ALUMINUM.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40.

No. 41B. Ores of Nickel, Cobalt, Chromium, Manganese and Aluminum.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10.

No. 42A. ORES OF RADIUM, URANIUM, THORIUM, YTTRIUM AND THE CERIUM METALS, ZIRCONIUM.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$100.

No. 42B. Ores of Radium, Uranium, Thorium, Yttrium and the Cerium Metals, Zirconium.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$25.

No. 43A. ORES OF TIN, TUNGSTEN, TITANIUM, MOLYBDENUM, VANADIUM, NIOBIUM AND TANTALUM, ARSENIC, MERCURY, BISMUTH AND SELENIUM.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40.

No. 43B. Ores of Tin, Tungsten, Titanium, Molybdenum, Vanadium, Niobium and Tantalum, Arsenic, Mercury, Bismuth and Selenium.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10.

No. 44A. ORE ASSOCIATIONS.

Sixty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$48. Glass case, \$30 extra. Includes all the more important minerals commonly found associated with valuable ores. List below.

No. 44B. Ore Associations.

Sixty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$12. Cabinet, \$3 extra. According to the following list.

1 ALBITE	21 ENDLICHITE	41 PYROXENE
2 ANALCITE	22 EPIDOTE	42 PYRRHOTITE
3 AMPHIBOLE	23 FLUORITE	43 QUARTZ
4 APATITE	24 FRANKLINITE	44 RHODONITE
5 APOPHYLLITE	25 GALENA	45 SERPENTINE
6 ARAGONITE	26 GARNET	46 SIDERITE
7 ARSENOPYRITE	27 GYPSUM	47 SPHALERITE
8 AZURITE	28 HEMATITE	48 SPODUMENE
9 BARITE	29 HEULANDITE	49 STIBNITE
10 BERYL	30 KAOLINITE	50 TALC
11 CALAMINE	31 MAGNETITE	51 TETRAHEDRITE
12 CALCITE	32 MALACHITE	52 TOPAZ
13 CELESTITE	33 MARCASITE	53 TOURMALINE
14 CERVANTITE	34 MUSCOVITE	54 WAD
15 CHALCOCITE	35 OLIGOCLEASE	55 WITHERITE
16 CHALCOPYRITE	36 ORTHOCLASE	56 WOLFRAMITE
17 CHRYSOCOLLA	37 PECTOLITE	57 WOLLASTONITE
18 CORUNDUM	38 PHLOGOPITE	58 WULFENITE
19 DATOLITE	39 PREHNITE	59 ZIRCON
20 DOLOMITE	40 PYRITE	60 ZOISITE

No. 45A. POLISHED ORNAMENTAL STONES.

Twenty-five specimens, natural edges, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$80. Small glass wall case, \$15 extra. A small series of beautiful minerals in common use for interior decoration and ornamental art. Forms by far the most beautiful aggregation of color we prepare. The artistic arrangement it permits, offers an altogether unexpected and dazzling display, in comparison with scientifically prepared collections. As an adjunct to the latter, however, it has an acknowledged value, in view of the growing importance of the decorative arts in the educational world. While the cost per specimen is quadruple that of other short collections, either of these ornamental series makes a most beautiful and acceptable gift to an individual or institution.

No. 45B. Polished Ornamental Stones.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$20. Same as above, but smaller. Oak cabinet, \$2 extra.

1 ROCK CRYSTAL	10 MOCHA STONE	18 LAPIS-LAZULI
2 RUTILATED QUARTZ	11 MOSS AGATE	19 FLUORITE
3 ROSE QUARTZ	12 WOOD OPAL	20 LABRADORITE
4 JASPER	13 JADE	21 RHODONITE
5 JASPERIZED WOOD	14 MALACHITE	22 MEXICAN ONYX
6 BRECCIA	15 SERPENTINE	23 MARBLE
7 HELIOTROPE	16 AMAZON-STONE	24 ALABASTER
8 TIGER-EYE	17 SODALITE	25 SATIN SPAR
9 BANDED AGATE		

No. 46A. ROUGH PRECIOUS AND SEMI-PRECIOUS STONES.

Twenty-five small specimens, \$15. These are mostly of good quality although not the best, as it is not necessary to have a flawless rough stone to indicate the general characteristics of valuable gem material. The colors represented are usually in the more highly prized shades. The following comprise the collection.

1 DIAMOND	14 TOURMALINE, green
2 CORUNDUM, Ruby	15 " Rubellite, pink
3 " Sapphire	16 ZIRCON, Hyacinth
4 " Star Sapphire	17 GARNET, Pyrope
5 " "Montana" Sapphire	18 " Spessartite
6 TOPAZ, white	19 QUARTZ, Amethyst
7 " yellow	20 CHRYSOLITE, Olivine
8 BERYL, Emerald	21 OPAL, precious, blue-green
9 " Aquamarine	22 " " milky
10 " golden	23 " " matrix
11 CHRYSOBERYL, "Cats Eye"	24 " " fire
12 SPINEL, Ruby	25 TURQUOIS
13 " blue	

No. 48A. AMERICAN ROCK COLLECTION.

We do not aim to supply petrographers, but the following elementary collection of typical common rocks is offered. Each specimen is labeled with name and locality, and has a number attached corresponding to this list.

Sixty specimens, 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$24. Glass case, \$30 extra.

No. 48B. American Rock Collection.

Sixty specimens, 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$6. Cabinet, \$3 extra. The entire list given below.

1	LIMESTONE, lithographic	31	GRANULYTE, Pegmatyte
2	" hydraulic	32	GNEISS
3	" Chalk	33	GREISEN
4	" Oölite	34	MICA SCHIST
5	" fossiliferous	35	HYDROMICA SCHIST
6	" shell, Coquina	36	FELSITE, Petrosilex
7	" Marl	37	PORPHYRY
8	" Travertine	38	TRACHYTE
9	" Marble, fine	39	OBSIDIAN
10	" coarse	40	PUMICE
11	DOLOMITE	41	SYENYTE
12	CONGLOMERATE, Puddingstone	42	QUARTZ SYENYTE
13	" Breccia	43	SYENYTE GNEISS
14	GRIT, Millstone	44	DITROYTE
15	SANDSTONE, concretions	45	DIORYTE
16	" argillaceous	46	ANDESYTE
17	" ferruginous, red	47	GABBRO
18	SHALE	48	DIABASE
19	ARGILLYTE, Slate	49	DOLERYTE, Basalt
20	KAOLINITE	50	PYROXENYTE
21	BRICK CLAY	51	AMPHIBOLYTE
22	TRIPOLYTE	52	AMPHIBOLE SCHIST
23	QUARTZYTE	53	EPIDOSYTE
24	ITACOLUMYTE	54	PERIDOTYTE
25	CHERT	55	CHLORITE SCHIST
26	JASPER	56	TALCOSE "
27	BUHRSTONE	57	STEATITE, Soapstone
28	GRANITE, red	58	" French Chalk
29	" gray, coarse	59	SERPENTINE, granular
30	" " fine	60	" Verde Antique

No. 51A. ROCK-FORMING MINERALS.

Sixty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$36. Glass case, \$30 extra. The new list includes the most important minerals mentioned in Rosenbusch-Iddings' "Microscopic Physiography of Rock-Making Minerals," and Zirkels' "Handbuch der Petrographie."

No. 51B. Rock-Forming Minerals.

Sixty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$9. Cabinet, \$3 extra. A much more comprehensive set than our old No. 51. List follows.

Rock-Forming Minerals.

The specific gravities given are only average values.

1	CASSITERITE	6.84	31	TOURMALINE	3.10
2	HEMATITE	5.30	32	ACTINOLITE	3.02
3	MAGNETITE	5.20	33	BIOTITE	3.01
4	ILMENITE	4.75	34	PREHNITE	2.94
5	CHROMITE	4.46	35	DOLOMITE	2.90
6	ZIRCON	4.45	36	WOLLASTONITE	2.86
7	RUTILE	4.25	37	MUSCOVITE	2.85
8	BROOKITE	4.14	38	CHLORITE	2.78
9	CORUNDUM	3.95	39	ANORTHITE	2.76
10	PYROPE	3.75	40	LAZULITE	2.75
11	STAUROLITE	3.74	41	TALC	2.74
12	DISTHENE	3.60	42	BERYL	2.72
13	TOPAZ	3.56	43	CALCITE	2.72
14	GROSSULAR	3.50	44	LABRADORITE	2.69
15	AUGITE	3.50	45	QUARTZ	2.65
16	ACMITE	3.49	46	OLIGOCLASE	2.64
17	TITANITE	3.48	47	ALBITE	2.63
18	OLIVINE	3.41	48	ELÆOLITE	2.60
19	VESUVIANITE	3.40	49	ORTHOCLASE	2.57
20	EPIDOTE	3.39	50	SANIDINE	2.56
21	ZOISITE	3.35	51	NEPHELINE	2.55
22	AXINITE	3.29	52	LEUCITE	2.47
23	SILLIMANITE	3.23	53	CANCRINITE	2.46
24	HORNBLENDE	3.22	54	GYPNUM	2.31
25	ANDALUSITE	3.20	55	SODALITE	2.28
26	BRONZITE	3.19	56	NATROLITE	2.23
27	FLUORITE	3.18	57	OPAL	2.21
28	ANTHOPHYLLITE	3.17	58	ANALCITE	2.19
29	APATITE	3.16	59	HYALITE	2.17
30	SPODUMENE	3.14	60	CHABAZITE	2.10

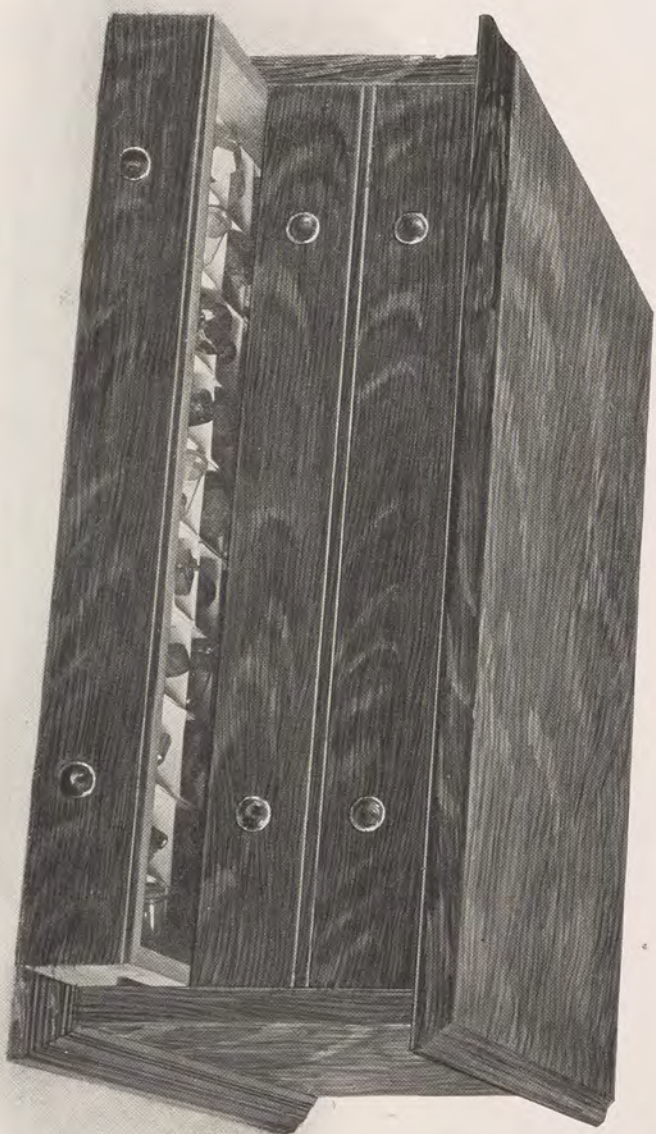


PLATE XI.
COMPLETE CRYSTAL COLLECTION, NO. 73A,
IN SPECIAL CABINET.



PLATE XII.

SAMPLE CRYSTAL SET, NO. 79A,
In Special Cabinet. Glass Top if so Ordered.

Crystallography.

LOOSE CRYSTALS FOR MEASUREMENT AND STUDY.

In no department is greater improvement and progress shown than in meeting the demands of the crystallographer—whether the mathematician seeking new and rare forms for investigation or the student beginning an elementary course.

Not only have the varied needs of scientists and educators been studied and the several collections entirely revised and extended accordingly, but the selection of the specimens themselves has been done by a competent mineralogist, under the advice and criticism of several high authorities. The crystals have been measured individually, whenever necessary to insure correct classification.

Prominent teachers of crystallography, well known as writers on the subject, have examined in detail the Complete Type Collection, and expressed surprise at finding such a unique and excellent series on sale. A prevailing opinion was voiced in the remark that the real worth of so extensive a collection, can only be appreciated by one who has attempted its preparation. With this generous approval came valuable suggestions which have been adopted.

THE ADVANCED COLLECTIONS, while much superior to those obtainable in the past, will be improved with the growth of our stock and the progress of the science. Twelve of these, corresponding to the Descriptive List, have been prepared simultaneously. The aggregate changes, as shown in future collections, will mean improvement. The arrangement and definitions in Dana's "Text-book of Mineralogy," have been carefully followed, making the sets especially valuable to those using this work or that of Penfield. The chapter on crystallography in his "Determinative Mineralogy," is well illustrated by this collection, and most of the Penfield crystal forms are shown. Any other desired arrangement may be prepared on order. The aim has been to represent well as large a number of forms as possible. A duplication of any combination has been avoided, even though occurring in different minerals. Variety of form, not species, is the object. As many groups as possible are represented under each of the six systems. Out of thirty-two possible groups, only twenty-three are known in nature. Of these, every one is represented in the longer list. Thus in one sense the title "complete" is not a misnomer.

The crystals selected are the best our facilities afford. They range generally from 1 to 4 cm. in length, and nearly all possess sufficiently sharp angles and bright planes for measurement with the reflecting goniometer. The majority are large enough for contact measurement.

The cabinets holding the crystals are made according to our latest designs, especially for these collections. See Plate XI. They are well made and handsomely finished in the best quartered oak. The 4 x 3 cm. white glazed pasteboard trays strikingly display the crystals. Each collection is numbered to correspond to a list, which gives both name and locality and full description of the form in the case of the advanced collections.

Special collections or parts of the listed collections are prepared on order.

Advanced.

No. 73A. COMPLETE CRYSTAL COLLECTION.

Three hundred measurable crystals in drawer cabinet. See Plate XI. As described in the Complete Crystal List. This set evenly covers the whole field of crystallography. \$150.

No. 75A. ABRIDGED CRYSTAL COLLECTION.

One hundred and fifty measurable crystals, as shown in the Abridged Crystal List. A careful elimination of rare and less important forms is here effected. In cabinet, \$60. Similar to Plate XII.

Complete Crystal Collection.

No. 73A, ENTIRE LIST, 300.

Abridged List.

No. 75A, NAMES MARKED +, 150.

I. Isometric System.

Normal Group—Galena Type.

1+	Cube	GALENA
2+	Octahedron	SPINEL
3+	Dodecahedron	GARNET
4+	Tetrahexahedron modifying cube.....	FLUORITE
5	Trigonal trisoctahedron modifying octahedron...	PYRITE
6+	Trapezohedron	GARNET
7+	Hexoctahedron modifying cube.....	FLUORITE
Combinations—		
8+	Cube modified by octahedron <i>o</i>	GALENA
9+	“ “ “ trapezohedron <i>m</i>	FLUORITE
10	Octahedron modified by cube <i>a</i>	GALENA
11+	“ “ “ dodecahedron <i>d</i>	MAGNETITE
12+	“ “ “ “ <i>d</i> and trape-	
	zohedron <i>m</i>	MICROLITE

- 13 Octahedron modified by dodecahedron *d*, trapezohedron *m* and cube *a*.....MICROLITE
 14+ Dodecahedron modified by cube *a*.....FLUORITE
 15 " " " octahedron *o*.....CUPRITE
 16+ " " " trapezohedron *m*.....GARNET
 17 Trapezohedron " " dodecahedron *d*....."

Pyritohedral Group—Pyrite Type.

- 18+ PyritohedronPYRITE
 19+ Cube"
 20+ Octahedron"
 21 Pyritohedron modified by cube *a*....."
 22+ " " " octahedron *o*....."
 23 " " " cube *a* and octahedron *o*....."
 24 " " " octahedron *o* & diploid *s*....."
 25+ Cube modified by pyritohedron *e*....." alt.
 26+ " " " diploid *s*....."
 27 Octahedron modified by pyritohedron *e*....."
 28 " " " diploid *s*....." alt.

Tetrahedral Group—Tetrahedrite Type.

- 29+ Tetrahedron modified by trigonal tristetrahedron *n*.....TETRAHEDRITE
 30 Tetrahedron modified by cube *a* and dodecahedron *d*.....BORACITE
 31+ Tetrahedron plus and minus, tetrahedral symmetryZUNYITE
 32 Tetrahedron plus and minus, octahedral symmetryDIAMOND

Gyroidal or Plagihedral Group—Cuprite Type.

- 33 Trapezohedral symmetry.....SAL-AMMONIAC

Tetartohedral Group—Ullmannite Type.

- 34+ Cubic symmetry.....ULLMANNITE

Groups Unidentified.

- 35+ Cubic symmetry.....BOLEITE
 36+ Octahedral symmetryDYSANALYTE
 37+ Trapezohedral "LEUCITE
 38 Cubo-octahedral "DYSANALYTE

II. Tetragonal System.*Normal Group—Zircon Type.*

- 39+ Unit pyramid *p*.....ZIRCON
 40 " " *p* and base *c*.....OCTAHEDRITE
 41+ " prism *m* and unit pyramid *p*.....ZIRCON
 42+ " " *m* and two unit pyramids *p* and *u*....."
 43 " and diametral prisms *m* and *a* and two unit pyramids *p* and *u*....."

- 44+ Unit and diametral prisms m and a and base c . . . VESUVIANITE
 45 " " " " m " a , unit and diametral pyramids p and e and base c "
 46+ Diametral prism a and unit pyramid HYACINTH
 47 Unit and diametral prisms m and a and unit pyramid p MALACON
 48+ Unit, diametral and ditetragonal prisms m , a and l and diametral pyramid e RUTILE
 49 Unit, diametral and ditetragonal prisms m , a and l , unit and diametral pyramids e and s "
 50 Diametral prism a , unit pyramid p and ditetragonal pyramid or zirconoid x HYACINTH
 51 Diametral prism a and base c APOPHYLLITE
 52+ " " " a " unit pyramid p "
 53+ " " " a , unit pyramid p and base c "
 54 " " " a , two unit pyramids p and r , and diametral pyramid e ANATASE

Pyramidal Group—Scheelite Type.

- 55+ Unit pyramid p SCHEELITE
 56 " and diametral pyramids p and e and base c STOLZITE
 57 " " " prisms m and a and unit pyramid p WERNERITE

Pyramidal-Hemimorphic Group—Wulfenite Type.

- 58+ Unit pyramid u and base c WULFENITE
 59+ Two unit pyramids e and u , two diametral pyramids n and s and base c "
 60 Unit prism m rounded, and base c "

Sphenoidal Group—Chalcopyrite Type.

- 61+ Sphenoid of first order p CHALCOPYRITE
 62+ Two sphenoids plus and minus, octahedral symmetry "
 63 Acute sphenoid Φ and scalenohedron x "

III. Hexagonal System.

Normal Group—Beryl Type.

- 64+ Unit prism m and base c BERYL
 65+ " " m , unit pyramid p and base c HANKSITE
 66 " and second order prisms m and a , dihedral prism and base c BERYL

Hemimorphic Group—Iodyrite Type.

- 67 Unit prism m and base c IODYRITE

Pyramidal Group—Apatite Type.

- 68+ Unit prism m and unit pyramid x APATITE
 69 " " m and base c PYROMORPHITE
 70 " " m , unit pyramid x and base c APATITE
 71 " " and second order prisms m and a and unit pyramid p "

- 72 Unit and second order prisms m and a , two unit pyramids x and r , second order pyramid and base c APATITE

Pyramidal-Hemimorphic Group—Nephelite Type.

- 73 Unit prism m and base c NEPHELITE

Rhombohedral Division.

Normal Group—Calcite Type.

- 74+ Rhombohedron r CALCITE
 75 " 73° SIDERITE
 76 " about 85° CHABAZITE
 77+ Flat " e CALCITE
 78+ Acute " M SILIC. CALCITE
 79 " " and base c SIDERITE
 80+ Positive and negative rhombohedrons and scalenohedron CALCITE
 81+ Scalenohedron v "
 82 " v and base c "
 83+ " and one rhombohedron r "
 84 Two " "
 85 Unit prism m and base c "
 86+ " " m " rhombohedron e "
 87+ " " m " " e and scalenohedron v "
 88 Three scalenohedrons and two rhombohedrons "
 89 Unit prism m , four rhombohedrons and two scalenohedrons "
 90+ Acute pyramid, second order SILIC. CALCITE
 91 Pyramid of second order n and base c CORUNDUM
 92 Prism " " " a " " c "
 93+ Pyramid " " " n , rhombohedron r and curved rhombohedron u HEMATITE
 94 Unit prism m , rhombohedron r , pyramid of second order n and base c "

Hemimorphic Group—Tourmaline Type.

- 95+ Unit and second order prisms m and a and two rhombohedrons r and o TOURMALINE
 96 Unit and second order prisms m and a , two rhombohedrons r and o and base c "
 97+ Triangular prism, striated and rhombohedron o "

Tri-rhombohedral Group—Phenacite Type.

- 98+ Unit and second order prisms m and a and third order rhombohedron x PHENACITE
 99+ Unit and second order prisms m and a , and two rhombohedrons r and e WILLEMITE
 100+ Acute rhombohedron M , obtuse rhombohedron and base c DOLOMITE

Trapezohedral Group—Quartz Type.

101	Two rhombohedrons <i>r</i> and <i>z</i>	QUARTZ
102+	Unit prism <i>m</i> and rhombohedrons <i>r</i> and <i>z</i>	"
103+	" " <i>m</i> , " <i>r</i> " <i>z</i> and trigonal pyramid <i>s</i>	"
104+	Unit prism <i>m</i> , rhombohedrons <i>r</i> and <i>z</i> and acute rhombohedron <i>M</i>	"
105+	Unit prism <i>m</i> , rhombohedrons <i>r</i> and <i>z</i> , trigonal pyramid <i>s</i> and trigonal trapezohedron <i>x</i> . Right-handed crystal.....	"
106+	Unit prism <i>m</i> , rhombohedrons <i>r</i> and <i>z</i> , trigonal pyramid <i>s</i> and trigonal trapezohedron <i>x</i> . Left-handed crystal.....	"
107	Acute rhombohedron <i>n</i> , striated and base <i>c</i>	CINNABAR

IV. Orthorhombic System.

Normal Group—Barite Type.

108	Macrodome <i>d</i> and brachydome <i>o</i>	BARITE
109+	Unit prism <i>m</i> , macrodome <i>d</i> and base <i>c</i>	"
110	" " <i>m</i> , " <i>d</i> , brachypinacoid <i>b</i> , pyramid and base <i>c</i>	"
111	Unit prism <i>m</i> , macrodome <i>d</i> , brachydome <i>o</i> , brachypinacoid <i>b</i> , pyramids and base <i>c</i>	"
112+	Unit prism <i>m</i> , macrodome <i>d</i> , brachydome <i>o</i> , brachypinacoid <i>b</i> and base <i>c</i>	"
113+	Macrodome <i>d</i> , macropinacoid <i>a</i> , two brachydomes and base <i>c</i>	"
114	Unit prism <i>m</i> , macrodome <i>d</i> , brachydome <i>o</i> and base <i>c</i>	CELESTITE
115	Unit and obtuse pyramids <i>p</i> and <i>s</i> and brachydome <i>n</i>	SULPHUR
116+	Unit and obtuse pyramids <i>p</i> and <i>s</i> , brachydome <i>n</i> and base <i>c</i>	"
117	Unit and obtuse pyramids <i>p</i> and <i>s</i> and base <i>c</i> . Sphenoidal type.....	"
118	Unit prism <i>m</i> , brachypinacoid <i>b</i> and three pyramids <i>p</i> , <i>s</i> and <i>r</i>	STIBNITE
119	Unit prism <i>m</i> and brachydome <i>u</i>	ARSENOPYRITE
120+	" " <i>m</i> " base <i>c</i>	MARCASITE
121+	" " <i>m</i> , macrodome <i>t</i> and base <i>c</i> , striated.....	THENARDITE
122+	" " <i>m</i> and base <i>c</i>	ANDALUSITE
123	" " <i>m</i> , macrodome <i>d</i> and base <i>c</i>	BOUGLISITE
124	" " <i>m</i> , " <i>d</i> , pyramids and base <i>c</i>	ANGLESITE
125+	" " <i>m</i> , macrodomes <i>d</i> and <i>l</i> , brachydome <i>o</i> , macropinacoid <i>a</i> , pyramids and base <i>c</i>	"
126	Unit prism <i>m</i> , macrodome <i>d</i> , macropinacoid <i>a</i> and base <i>c</i>	"
127	Unit prism <i>m</i> , pyramids <i>e</i> and <i>z</i> and brachydome <i>t</i>	BROOKITE
128	" " <i>m</i> and pyramid <i>z</i>	"
129+	" " <i>m</i> " pyramids <i>e</i> and <i>z</i>	"

- 130 Macrodome *r* and brachydome *b*, striated.....ANHYDRITE
 131 Unit and brachyprisms *m* and *l* and unit pyramids *p*.....TOPAZ
 132 Unit and brachyprisms *m* and *l* and two brachydomes *f* and *y*.....“
 133 Unit and brachyprisms *m* and *l*, brachydome *y* and base *c*.....“
 134+ Unit and brachyprisms *m* and *l*, unit and obtuse pyramids *p* and *o*, brachydome *y* and base *c*....“
 135 Unit and brachyprisms *m* and *l*, two brachydomes *f* and *y*, pyramids and base *c*.....“
 136+ Unit and brachyprisms *m* and *l*, unit and obtuse pyramids *p* and *o*, brachydome *y*, macrodome *d* and base *c*.....“
 137+ Unit and brachyprisms *m* and *l*, unit and obtuse pyramids *p* and *o*, brachydome *y*, brachypinacoid *b*, macrodome *d* and base *c*.....“
 138+ Unit prism *m*, brachypinacoid *b* and base *c*.....STAUROLITE
 139 Unit prism *m*, brachypinacoid *b*, one set of macrodomes *r* and base *c*.....“
 140+ Unit prism *m*, brachypinacoid *b*, two sets of macrodomes *r* and base *c*.....“
 141+ Unit prism *m*, brachypinacoid *b*, brachydome *k* and pyramids (twinned)ARAGONITE
 142 Unit prism *m*, pyramid *p*, brachydome *i* and brachypinacoid *b*.....CERUSSITE
 143 Unit prism *m*, brachypinacoid *b*, brachydome *t*, macrodome *e*, pyramids *n* and *q* and base *c*....HERDERITE
 144 Unit prism *m* and brachydome *e*.....LIBETHENITE
 145 “ “ *m* “ pyramid *r*, striated.....CHILDRENITE
 146 Macropinacoid *a*, brachypinacoid *b*, macrodome *k*, pyramids *o* and *u* and base *c*.....COLUMBITE
 147 Unit prism *m*, prism *g*, macropinacoid *a*, macrodomes *h*, *k* and *l*, pyramids and base *c*.....“
 148+ Unit prism *m*, macro- and brachypinacoids *a* and *b*, brachydome *q*, pyramid *r* and base *c*.....ENSTATITE

Hemimorphic Group—Calamine Type.

- 149 Unit prism *m*, macropinacoid *a*, brachypinacoid *b*, two macrodomes and brachydome *i*.....CALAMINE
 150 Unit prism *m*, brachypinacoid *b*, brachydome *d* and base *c*.....STEPHANITE
 151 Macrodome *s*, brachypinacoid *b* and base *c*.....STRUVITE
 152 Unit prism *m*, macrodome *s* and base *c*.....“

Sphenoidal Group—Epsomite Type.

- 153 Unit prism *m*, sphenoid *z*, plus and minus.....EPSOMITE

V. Monoclinic System.*Normal Group—Gypsum Type.*

- 154+ Unit prism *m*, clinopinacoid *b* and unit pyramid *p*.....GYPSUM

- 155+ Unit prism *m*, clinopinacoid *b*, unit pyramid *p*
and orthodome *e*.....GYPSUM
- 156 Unit and clinoprisms *m* and *k*, clinopinacoid *b*,
unit pyramid *p* and orthodome *e*.....“
- 157 Unit prism *m*, clinopinacoid *b* and base *c*.....ORTHOCLASE
- 158+ Unit prism *m*, clinopinacoid *b*, orthodome *y* and
base *c*.....“
- 159+ Unit prism *m*, prism *z*, clinopinacoid *b*, ortho-
dome *y* and base *c*.....“
- 160+ Unit prism *m*, clinopinacoid *b*, orthodome *y*, pyra-
mid *o* and base *c*.....“
- 161 Unit prism *m*, prism *z*, clinopinacoid *b*, orthodome
y, pyramid *o* and base *c*.....“
- 162+ Unit prism *m*, orthodome *x* and base *c*.....VALENCIANITE
- 163 Unit prism *m*, prism *z*, orthodome *x* and base *c*...ADULARIA
- 164+ Unit prism *m*, orthopinacoid *a*, clinopinacoid *b*,
orthodome *d*, pyramids *p* and *s* and base *c*....AUGITE
- 165 Unit prism *m*, orthopinacoid *a*, clinopinacoid *b*,
pyramids *p* and *o*.....“
- 166+ Unit prism *m* and prisms *f* and *x*, orthopinacoid
a, clinopinacoid *b*, pyramids *p* and *s*, ortho-
and clinodomes and base *c*.....DIOPSIDE
- 167+ Unit prism *m*, orthopinacoid *a*, clinopinacoid *b*,
and pyramid *s*.....AUGITE
- 168+ Unit prism *m*, clinopinacoid *b*, clinodome *r*, ortho-
dome *p* and pyramidHORNBLende
- 169+ Unit prism *m*, pyramid *p* and base *c*.....TITANITE
- 170 “ “ *m*, orthodome “ “ *c*.....“
- 171+ “ pyramids *p* and *d*.....LAZULITE
- 172+ Pyramid *s* and base *c*.....GLAUBERITE
- 173 Unit prism *m*, pyramid *n*, orthopinacoid *a*, ortho-
domes *r* and *i* and base *c*.....EPIDOTE
- 174 Prism *M* and base *c*.....MUSCOVITE
- 175+ “ *M*, clinopinacoid *b* and base *c*.....“
- 176 Unit prism *m*, pyramid *h*, orthodomes σ and θ ,
clinodomes *l* and *p* and base *c*.....AZURITE
- 177+ Unit prism *m*, orthopinacoid *a*, pyramid *h* and two
orthodomes“
- 178 Unit prism *m*, pyramid, orthodome σ and base *c*..“
- 179 Unit prism *m*, clinopinacoid *b*, orthodomes *s* and *t*
and base *c*.....HEULANDITE
- 180 Unit prism *m*, orthopinacoid *a*, orthodome *x*, clino-
domes *m_x*, *g* and *t*, pyramids *n* and ϵ and base *c*. DATOLITE
- 181 Unit prism *m*, clinodome *e* and pyramid *r*.....GAY-LUSSITE
- 182 “ “ *m*, ortho- and clinopinacoids *a* and *b*,
pyramids *z* and *o* and base *c*.....BORAX
- 183 Unit prism *m*, prism *f* and pyramid *t*.....CROCOITE
- 184+ Long prism striated, clinodomes *z* and *w*, pyramid
t, orthodome *k* and base *c*.....“
- 185 Long prism striated and clinodome *z*.....“

- 186 Unit prism *m* and prism *t*, orthopinacoid *a*, clinodomes κ , *u*, orthodome and pyramids β and ω . . COLEMANITE
 187 Unit prism *m*, prism *t*, orthopinacoid *a*, clinopinacoid *b*, orthodomes *h* and *i*, clinodomes *k* and *a*, pyramids β , *v*, *k*, *y* and *a* and base *c* “

Clinohedral Group—Clinohedrite Type.

- 188 Prism *m*, pyramids *t*, *p*, *z* and *q* CLINOHEDRITE

VI. Triclinic System.*Normal Group—Axinite Type.*

- 189+ Unit prisms *M* and *m*, macropinacoid *a*, macrodome *s* and pyramid *r* AXINITE
 190 Unit prisms *M* and *m*, macropinacoid *a*, brachypinacoid *w*, brachydome *y*, pyramids *r* and *n* and base *c* “
 191 Unit prisms *M* and *m*, brachypinacoid *b*, brachydome *o*, macrodome *x* and base *c* PERICLINE
 192+ Unit prisms *M* and *m*, macrodome *x* and base *c* ALBITE
 193+ “ “ *M* “ *m*, brachypinacoid *b*, brachydome *e*, macrodome *y*, pyramid *p* and base *c* ANORTHITE
 194+ Unit prisms *M* and *m*, prisms *z* and *f*, macrodome *x*, brachypinacoid *b* and base *c* AMAZONSTONE
 195+ Unit prisms *M* and *m*, prisms *z* and *f*, brachypinacoid *b*, macrodome *x*, pyramid *o* and base *c* “
 196 Unit prisms *M* and *m*, prisms *z* and *f*, brachypinacoid *b*, macrodome *x* and *y* and base *c* “
 197+ Prisms *M* and *m*, macropinacoid *a*, brachypinacoid *b* and pyramid *q* CYANITE
 198+ Prisms *M* and *m*, brachypinacoid *b*, pyramid *q* and base *c* RHODONITE
 199 Prisms *M* and *m*, brachypinacoid *b* and pyramid *k* “
 200+ Prisms *M* and *m*, pyramids *h*, *g*, *f*, *d* and base *c* BABINGTONITE

Twins.*I. Isometric System.*

- 201 Octahedrons, contact, tw. pl. parallel to octahedral face SPINEL
 202+ Cubes, penetration, tw. pl. parallel to octahedral face FLUORITE
 203+ Pyritohedrons, penetration, tw. axis normal to dodecahedral face PYRITE
 204 Tetrahedrons, contact, tw. pl. parallel to octahedral face SPHALERITE

II. Tetragonal System.

- 205+ Prismatic, tw. pl. parallel to pyramid *e* ZIRCON
 206 “ “ “ “ “ “ “ *e* CASSITERITE

- 207+ Prismatic, tw. pl. parallel to pyramid *e*. RUTILE
 208 Prismatic, tw. pl. parallel to pyramid *e*, repeated
 twinning "
 209+ Prismatic, tw. pl. parallel to pyramid *e*, repeated
 twinning eightling. "
 210 Tw. pl. parallel to unit pyramid *f*. CHALCOPYRITE
 211 " " " " a pyramid face (trilling) . . . CUMENGEITE
 212 " " " " " " (truncated
 trilling) "

III Hexagonal System.

- 213 Acute rhombohedrons, penetration. Vertical or *c*
 axis, the tw. axis. CINNABAR
 214+ Normal rhombohedrons, penetration, tw. axis *c* . . . CHABAZITE
 215+ Scalenohedrons, contact, tw. pl. the base *c*. CALCITE
 216+ " " " " " obtuse rhom-
 bohedron *e*. "
 217 Prismatic, contact, tw. pl. the rhombohedron *r*,
 " Butterfly twin" "
 218+ Hexagonal type, tw. axis *c*. PHACOLITE
 219 " " " " *c*, composite penetration
 twin "
 220 Penetration twin, tw. axis *c*. QUARTZ
 221 " " " pl. *a* (1120), Brazil Law. . . "
 222+ Contact twin, tw. pl. *e*, (1122) "

IV. Orthorhombic System.

- 223+ Prismatic, pseudo-hexagonal symmetry, tw. pl.
 prism *m*, about 60°. ARAGONITE
 224 Pyramidal, pseudo-hexagonal symmetry, tw. pl.
 prism *m*. WITHERITE
 225+ Fiveling law, tw. pl. prism *m*, about 70½°. MARCASITE
 226 Penetration, tw. pl. *p* (031). CHRYSOBERYL
 227 Penetration, tw. pl. parallel to dome *e*. ARSENOPIRYTE
 228 Cruciform, tw. pl. brachydome *x*. STAUROLITE
 229+ " " " pyramid *z*. "
 230+ " " " dome *e*. THENARDITE
 231+ Contact, tw. pl. prism *m*, "Spear head" twin. . . . CERUSSITE
 232 " " " " *m*, stellate twin. "
 233 " " " " *m*, reticulated twinning. "

V. Monoclinic System.

- 234+ Contact, tw. pl. *a*. AUGITE
 235 " " axis *c* (vertical). LAZULITE
 236 " " " *c*, Carlsbad twin. ORTHOCLASE
 237+ Penetration, tw. axis *c*, Carlsbad twin. "
 238+ Contact, tw. pl. the clinodome *n*, Baveno twin. "
 239 Penetration, tw. pl. the orthopinacoid *a*. GYPSUM
 240+ " " " " " *a*, "Swal-
 low-tail" twin. "

- 241 Contact, tw. pl. the orthodome *a*.....TITANITE
 242+ Cruciform-penetration, tw. pl. the base *c*.....STILBITE
 243+ " " " " " *c*, simple
 formPHILLIPSITE
 244+ Cruciform-penetration, tw. pl. the base *c*, com-
 pounded *e*, then twinned on *m*.....HARMOTOME
 245 Cruciform-penetration, tw. pl. the base *c*, united
 with *e*, then repeated with prism *m*, as the twin-
 ning plane.....PHILLIPSITE
 246+ Contact tw. pl. normal to *c*.....EUDIDYMITE

VI. *Triclinic System.*

- 247+ Albite law, tw. pl. *b*, polysynthetic.....LABRADORITE
 248 Pericline law, tw. pl. parallel to *b* axis.....PERICLINE
 249+ Polysynthetic, composition face *a*.....CYANITE
 250 Manebach law, tw. pl. the base *c*.....AMAZONSTONE

Regular Groupings of Crystals.

- | | | | | |
|--------|--|---|-------------------|-----------------|
| 251+ } | Parallel growth of crystals of one species | { | fern, | COPPER |
| 252 } | | | rosette, | HEMATITE |
| 253+ } | | | capped, | AMETHYST |
| 254 } | Parallel growth of crystals | { | Staurolite on | CYANITE |
| 255+ } | | | of two species... | Chalcopyrite on | SPHALERITE |

Irregularities of Crystals.

(1) *Distortion.*

- 256 Elongated cube.....FLUORITE
 257+ Twisted "PYRITE
 258 Elongated octahedron.....HALITE
 259 Flattened dodecahedron.....GARNET
 260 Elongated "COPPER
 261+ Flattened cubo-octahedron.....HALITE
 262 Elongated "DYSANALYTE
 263 " trapezohedronGARNET
 264+ Flattened rhombohedron.....HEMATITE
 265+ Abnormal development of one rhombohedron....QUARTZ
 266 " " " opposite rhombohedral
 faces "
 267+ Elongated rhombohedron and flattened prism.... "

(2) *Imperfections on the Surfaces of Crystals.*

- 268 Striations due to oscillatory combination, on cube..PYRITE
 269+ " " " " " " prism.QUARTZ
 270+ " " " " " " rhomb.CALCITE
 271 " " " repeated twinning.....MICROCLINE
 272+ Markings from erosion, etc., on cube.....GALENA
 273 " " " " " pyramidCORUNDUM
 274+ " " vicinal prominences.....FLUORITE
 275+ " due to oscillatory combination, octahe-
 dral, dodecahedral faces..... "

- 276+ Curved surfaces due to oscillatory combinations,
prism and scalenohedron.....CALCITE
277+ Curved surfaces due to independent molecular
conditions, rounded.....DOLOMITE
278 Curved surfaces due to independent molecular
conditions, sheaf.....STILBITE
279+ Curved surfaces due to mechanical origin, joined..BERYL
280 " " " " bent...TOURMALINE
281 Hollowed cube, stepped.....HALITE
282+ Cavernous rhombohedron.....QUARTZ

(3) *Internal Imperfections and Inclusions.*

- 283+ Enclosing liquid with moving bubble.....QUARTZ
284 Microscopic inclusions.....BERYLLONITE
285+ Enclosing Tourmaline.....QUARTZ
286 " Bitumen "
287 " Sulphur GYPSUM
288 Microlites, crystallites, etc.....OLIGOCLASE
289 Symmetrically included Chlorite, "phantom"....QUARTZ
290+ " " carbonaceous impurities. CHIASTOLITE

Pseudomorphs.

(1) *By Substitution.*

- 291 Cassiterite replacing.....ORTHOCLASE

(2) *By Deposition.*

- 292 Incrustation of Quartz on.....FLUORITE
293+ " " Anglesite on.....CERUSSITE
294 InfiltrationQUARTZ

(3) *By Alteration.*

- 295+ Paramorph of Rutile after.....BROOKITE
296+ Loss of an ingredient by Azurite, forming.....COPPER
297+ Assumption of a foreign substance by Cuprite,
formingMALACHITE
298+ Partial exchange of constituents of Pyrite, form-
ingLIMONITE
299 Partial exchange of constituents of Magnetite,
formingHEMATITE
300 Partial exchange of constituents of Muscovite,
formingIOLITE

Elementary.

The following are an improvement on former sets sold at about the same prices. The crystals supplied are all over 1 cm. in length, and many reach 4 cm. Intended for elementary work, they are sufficiently sharp for contact measurement. Many are bright enough for the reflecting goniometer. As far as practicable, simple forms of symmetrical and model-like aspect are chosen.

No. 77A. SCHOOL CRYSTAL SET.

Fifty measurable crystals in cabinet, similar to Plate XII. Following the Elementary List. \$15.

No. 79A. SAMPLE CRYSTAL SET.

Twenty-five measurable crystals in cabinet, as shown in Plate XII, \$5. Includes those starred (*) in the following list. Merely a few representative examples of simple forms, and intended to show the appearance of natural crystals in a general way, rather than to illustrate even the shortest course. Useful for nature-study classes in primary work.

Elementary Crystal Collection.

ENTIRE LIST FORMS No. 77A. THOSE MARKED * COMPRISE No. 79A.

I. Isometric System.

- 1* FLUORITE
- 2 SPINEL
- 3* GARNET
- 4 LEUCITE
- 5* GALENA
- 6* MAGNETITE
- 7 GARNET, modified
- 8 CUPRITE, pseudomorph
- 9* PYRITE
- 10* " "
- 11 " twin

II. Tetragonal System.

- 12* ZIRCON
- 13 RUTILE
- 14* " twin
- 15 VESUVIANITE
- 16 APOPHYLLITE
- 17* WULFENITE
- 18 CHALCOPYRITE

III. Hexagonal System.

- 19 BERYL
- 20 HANKSITE
- 21* APATITE
- 22 VANADINITE
- 23 SIDERITE
- 24* CALCITE
- 25 " modified

- 26 CALCITE, cont'g sand
- 27 " twin
- 28* HEMATITE
- 29* TOURMALINE, black
- 30 " green
- 31* QUARTZ

IV. Orthorhombic System.

- 32* BARITE
- 33* SULPHUR
- 34 ANDALUSITE
- 35 THENARDITE, twin
- 36* TOPAZ
- 37 BROOKITE, paramorph
- 38 STAUROLITE, twin
- 39* ARAGONITE, "

V. Monoclinic System.

- 40* GYPSUM
- 41* ORTHOCLASE
- 42* " twin
- 43* PYROXENE
- 44* AMPHIBOLE
- 45* TITANITE
- 46 GLAUBERITE
- 47 MUSCOVITE

VI. Triclinic System.

- 48 AXINITE
- 49* MICROCLINE
- 50 CYANITE

No. 80A. LECTURE-TABLE CRYSTALS.

Twenty-five measurable crystals, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.). These are greatly limited in number by Nature's supply. Few crystals

occur large enough to be recognized across a room, or even when passed rapidly among a class. We have, however, arranged this incomplete series, embracing merely representative examples of the simpler forms. Some are a little rough in outline, but all are sufficiently well defined to illustrate the form, and are eminently adapted to this purpose. \$60. Conveniently kept in an oak wall cabinet, as shown in Plate XIII, \$15 extra. According to list.

No. 81A. Lecture-Table Crystals.

Twenty-five measurable crystals, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.). Like above, except in size. \$15. List follows. Oak cabinet, \$2 extra.

<i>Isometric.</i>		<i>Orthorhombic.</i>	
1	FLUORITE	14	ANDALUSITE
2	FRANKLINITE	15	SULPHUR
3	GARNET	16	BARITE
4	SPHALERITE	17	ENSTATITE
5	PYRITE		
<i>Tetragonal.</i>		<i>Monoclinic.</i>	
6	VESUVIANITE	18	GYP SUM
7	WERNERITE	19	ORTHOCLASE
		20	" twin
<i>Hexagonal.</i>		21	PYROXENE
8	BERYL	22	AMPHIBOLE
9	APATITE	23	MUSCOVITE
10	TOURMALINE		
11	QUARTZ	<i>Triclinic.</i>	
12	CALCITE	24	RHODONITE
13	" twin	25	MICROCLINE

List of Individual Crystals and Index to Complete Crystal List.

NOTE.—As the same form may sometimes be found in a dozen species, the collection which does not duplicate forms, necessarily omits some important minerals.

The following can generally be furnished as individual crystals when desired.

The number or numbers after each name, indicate the position in the Descriptive List of the Complete Crystal Collection.

Prices for selected measurable specimens generally range from \$0.10 to \$0.75, rarely as much as \$1 to \$2 each. Large or very rare crystals



PLATE XIII.

GLASS CASE (25 SPECIMENS).

For Lecture-Table-Crystals or Other Short Collections.

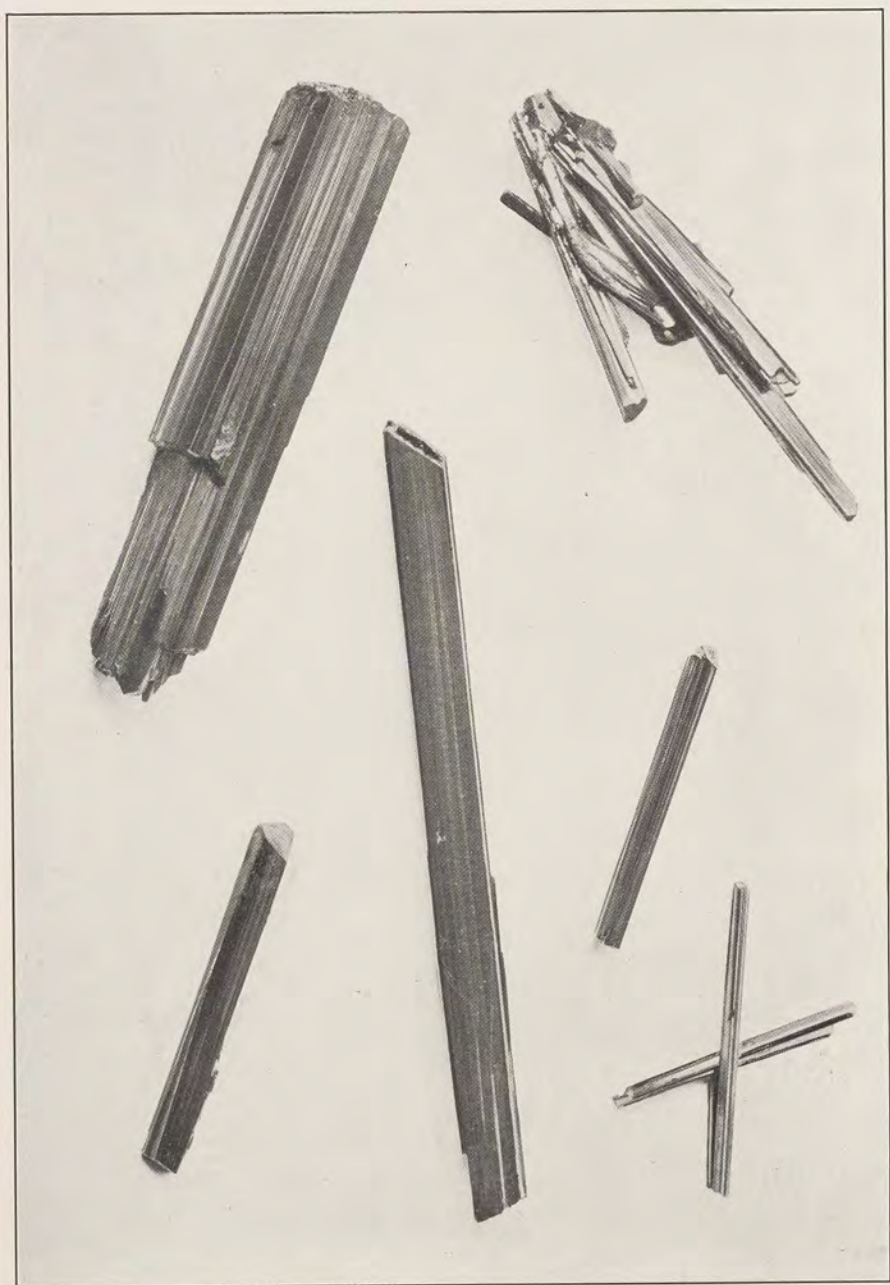


PLATE XIV.
CROCOITE, DUNDAS, TASMANIA.

for cabinet or museum are often more costly. Some common crystals sold by the dozen or hundred of a kind, as low as \$0.01 each. Prices and samples to teachers on application.

- ACMITE (Ægirite), Mono.
 ADULARIA, Mono., 162, 163
 ALBITE, Tric., 191, 192
 " twin, Tric., 248
 ALEXANDRITE, twin, Orth.
 AMAZON STONE, Tric., 194, 195, 196
 " " twin, 250
 AMETHYST, Rhomb., 253
 AMPHIBOLE, Mono., 168
 ANALCITE, Isom.
 ANATASE, Tetr., 54
 ANDALUSITE, Orth., 122, 290
 ANGLESITE, " 124, 125, 126
 ANKERITE, Rhomb.
 ANORTHITE, twin, Tric., 193
 APATITE, Hex., 68, 70, 71, 72
 APOPHYLLITE, Tetr., 51, 52, 53
 ARAGONITE, Orth., 141
 " twin, 223
 ARFVEDSONITE, Mono.
 ARGENTITE, Isom.
 ARSENOPYRITE, Orth., 119
 " twin, 227
 AUGITE, Mono., 164, 165, 167
 " twin, 234
 AXINITE, brown, Tric., 189, 190
 AZURITE, Mono., 176, 177, 178
 BABINGTONITE, Tric., 200
 BARITE, Orth., 108 to 113
 BERYL, Hex., 64, 66, 279
 BERYLLONITE, Orth., 284
 BOLEITE (Percylite), Isom., 35
 BORACITE, Isom., 30
 BORAX, Mono., 182
 BOUGLISITE, Orth., 123
 BOURNONITE, twin, Orth.
 BROMLITE, Orth.
 BROOKITE, " 127, 128, 129
 CALAMINE, " 149
 CALCITE, Rhomb., 74, 77, 78, 80 to 90
 " twin, 215, 216, 217
 CASSITERITE, Tetr.
 " twin, 206
 CATAPLEHITE, Hex. (?)
 CELESTITE, Orth., 114
 CERUSSITE, " 142
 CERUSSITE, twin, 231, 232, 233
 CHABAZITE, Rhomb., 76
 " twin, 214, 218, 219
 CHALCOCITE, Orth.
 CHALCOPYRITE, Tetr., 61, 62, 63
 " twin, 210
 CHESTERLITE, Tric.
 CHILDRENITE, Orth., 145
 CHONDRODITE, Mono.
 CHRYSOBERYL, twin, Orth., 226
 CINNABAR, Rhomb., 107
 " twin, 213
 CLINOHEDRITE, Mono., 188
 COBALTITE, Isom.
 COLEMANITE, Mono., 186, 187
 COLUMBITE, Orth., 146, 147
 COPPER, Isom., 251, 260
 CORUNDUM, Rhomb., 91, 92, 273
 CROCOITE, Mono., 183, 184, 185
 CUMENGEITE, Tetr.
 " twin, 211, 212
 CUPRITE, Isom., 15
 CYANITE, Tric., 197
 " twin, 249
 DANBURITE, Orth.
 DATOLITE, Mono., 180
 DIAMOND, Isom., 32
 DIASPORE, Orth.
 DIOPSIDE, Mono., 166
 DIOPTASE, Rhomb.
 DOLOMITE, " 100, 277
 DURANGITE, Mono.
 DYSANALYTE, Isom., 36, 38
 EMBOLITE, "
 ENARGITE, Orth.
 ENDLICHITE, Hex.
 ENSTATITE, Orth., 148
 EPIDIDYMITE, Mono.
 EPISTILBITE, "
 EPSOMITE, Orth., 153
 EUDIALYTE, Rhomb.
 EUDIDYMITE, Mono.
 " twin, 246
 FLUORITE, Isom., 4, 7, 9, 256, 274, 275
 " twin, 202
 FOWLERITE, Tric., 198

- FRANKLINITE, Isom.
 GALENA, Isom., 1, 8, 10, 272
 GARNET, " 3, 6, 16, 17, 259, 263
 GAY-LUSSITE, Mono., 181
 GEHLENITE, Tetr.
 GLAUBERITE, Mono., 172
 GLAUCODOT, Orth.
 GMELINITE, twin, Rhomb.
 GYPSUM, Mono., 154, 155, 156
 " twin, 239, 240
 HALITE, Isom., 258, 261, 281
 HANKSITE, Hex., 65
 HARMOTOME, twin, Mono., 244
 HAUSERITE, Isom.
 HEMATITE, Rhomb., 93, 94, 252
 HERDERITE, Orth., 143
 HEULANDITE, Mono., 179
 HORNBLende, Mono., 168
 HYACINTH, Tetr., 46, 50
 IDOCRASE, " 44, 45
 IODYRITE, Hex., 67
 JAROSITE, Rhomb.
 LABRADORITE, twin, Tric., 247
 LAURIONITE, Orth.
 LAZULITE, Mono., 171
 " twin, 235
 LEADHILLITE, twin, Mono.
 LEUCITE, Isom., 37
 LIBETHENITE, Orth., 144
 MAGNETITE, Isom., 11
 MALACON, Tetr., 47
 MANGANITE, Orth.
 MARCASITE, " 120
 " twin, 225
 MARTITE, Isom., 299
 MATLOCKITE, Tetr.
 MAZAPILITE, Orth.
 MEIONITE, Tetr.
 MELILITE, "
 MENEGHINITE, Orth.
 MICROCLINE, Tric., 194, 195, 196
 " twin, 250, 271
 MICROLITE, Isom., 12, 13
 MIMETITE, Hex.
 MOLYBDENITE, Hex.
 MONAZITE, Mono.
 MONTICELLITE, Orth.
 MUSCOVITE, Mono., 174, 175
 NEPTUNITE, "
 NEWBERYITE, Orth.
 NORTHUPITE, Isom.
 OCTAHEDRITE, Tetr., 40
 OLIVENITE, Orth.
 ORPIMENT, "
 ORTHOCLASE, Mono., 158 to 163
 " twin, 236, 237, 238
 PACHNOLITE, Mono.
 PAISBERGITE, Tric., 199
 PENNINITE, Mono.
 PERCYLITE (Boleite), Isom., 35
 PERICLINE, Tric., 191
 " twin, 248
 PHACOLITE, " Rhomb., 218, 219
 PHARMACOSIDERITE, Isom.
 PHENACITE, Rhomb., 98
 PHILLIPSITE, twin, Mono., 243, 245
 PHOSGENITE, Tetr.
 PINITE, Mono., 300
 PISTACITE, Mono., 173
 PROUSTITE, Rhomb.
 PYRRHOTITE, "
 PYRITE, Isom., 18 to 28, 257, 268
 " twir, 203
 PYROLUSITE, Orth.
 PYROMORPHITE, Hex., 69
 PYROSMALITE, Rhomb.
 PYROXENE, Mono., 164 to 167
 " twin, 234
 PYRRHOTITE, Hex.
 QUARTZ, Rhomb., 101 to 106, 265,
 266, 267, 269, 282,
 283, 285, 286, 289
 " twin, 220, 221, 222
 RASRITE, twin, Mono.
 REALGAR, Mono.
 RHODOCHROSITE, Rhomb.
 RHODONITE, Tric., 198, 199
 RUTILE, Tetr., 48, 49
 " twin, 207, 208, 209
 SAL-AMMONIAC, Isom., 33
 SCAPOLITE, Tetr., 57
 SCHEELITE, " 55
 SENARMONTITE, Isom.
 SIDERITE, Rhomb., 75, 79
 SMALTITE, Isom.
 SMITHSONITE, Rhomb.
 SPHALERITE, Isom.
 " twin, 204
 SPHENE, Mono., 169, 170
 " twin, 241
 SPINEL, Isom., 2
 " twin, 201

- SPODUMENE, Mono.
STAUROLITE, Orth., 138, 139, 140
 " twin, 228, 229
STEENSTRUPINE, Rhomb.
STEPHANITE, Orth., 150
STIBNITE, Orth., 118
STILBITE, twin, Mono., 242
STOLZITE, Tetr., 56
STRONTIANITE, twin, Orth.
STRUVITE, Orth., 151, 152
SULPHUR, " 115, 116, 117
TETRAHEDRITE, Tetr., 29
THENARDITE, Orth., 121
 " twin, 230
THOMSENOLITE, Mono.
THORITE, Tetr.
TITANITE, Mono., 169, 170
 " twin, 241
TOPAZ, Orth., 131 to 137
TORBERNITE, Tetr.
TOURMALINE, Rhomb., 95, 96, 97
TROOSTITE, " 99
ULLMANNITE, Isom., 34
VANADINITE, Hex.
VESUVIANITE, Tetr., 44, 45
VIVIANITE, Mono.
WERNERITE, Tetr., 57
WILLEMITE, Troostite, Rhomb., 99
WITHERITE, twin, Orth., 224
WOLFRAMITE, Mono.
WULFENITE, Tetr., 58, 59, 60
XENOTIME, "
ZIRCON, " 39, 41, 42, 43, 46, 50
 " twin, 205
ZOISITE, Orth.
ZUNYITE, Isom., 31



Physical Mineralogy.

Series Illustrating Hardness, Specific Gravity, Color, Effect of Radium on Minerals, etc.

With the exception of crystals, there are no collections prepared by us upon which are bestowed a greater amount of expert labor than in the selection of just the right specimens to illustrate the various physical characters of minerals. This applies to each section but particularly to structure and color. With the loose terminology employed under these headings, the adjectives are sometimes more suggestive than exact. In general the definitions of Dana have been followed. Under color, the terms illustrated are mostly in common use, a large number of less familiar ones being eliminated.

It should be borne in mind that the mere names of minerals opposite the different terms mean much less than the individual character of the specimen chosen. The same species often well represents different characters. As far as possible, however, the duplication of species has been avoided.

Apart from the scarcity of crystal forms, the entire physical series, and notably the color section, makes the most showy and attractive large collection cataloged.

Glass wall case to hold 25 museum specimens, 12 x 9 cm. each ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), costs \$15 extra; 60 specimens, \$30; 125 specimens, \$50. A flat oak case with lid, holding 25 specimens, 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), costs \$2 extra; 60 specimens, \$3. Drawer cabinet for 125 specimens, 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), \$6 extra.

For lists of the following collections, see parts of Complete Physical Series List.

No. 92A. HARDNESS, TENACITY AND FUSIBILITY.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$20.

No. 92B. Hardness, Tenacity and Fusibility.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$5.

No. 95A. STRUCTURE, CLEAVAGE, TASTE, ETC.

Fifty specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40.

No. 95B. Structure, Cleavage, Taste, Etc.

Fifty specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10.

No. 97A. SPECIFIC GRAVITY.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40.

No. 97B. Specific Gravity.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10.

No. 101A. COLOR AND LUSTER.

Seventy-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$100.

No. 101B. Color and Luster.

Seventy-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$25.

No. 104B. EFFECT OF RADIUM, RÖNTGEN AND ULTRA-VIOLET RAYS, HEAT, FRICTION AND MAGNETISM.

Twenty-five specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$40.

No. 104B. Effect of Radium, Röntgen and Ultra-Violet Rays, Heat, Friction and Magnetism.

Twenty-five specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$10.

No. 111A. COMPLETE PHYSICAL SERIES.

Includes all of the foregoing series as listed. Two hundred specimens, averaging 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks, \$240. Glass cases, \$75 extra.

No. 111B. Complete Physical Series.

Includes all of the foregoing series as listed. Two hundred specimens, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$60. Drawer Cabinet, \$9 extra.

Complete Physical Series List.

Entire List Constitutes Nos. 111A and 111B.

Hardness, Tenacity and Fusibility.

Nos. 92A and 92B.

Hardness.

- 1 *H.*— 1.....TALC
- 2 *H.*— 2.....GYPSUM
- 3 *H.*— 3.....CALCITE
- 4 *H.*— 4.....FLUORITE
- 5 *H.*— 5.....APATITE
- 6 *H.*— 6.....FELDSPAR
- 7 *H.*— 7.....QUARTZ
- 8 *H.*— 8.....TOPAZ
- 9 *H.*— 9.....CORUNDUM
- 10 *H.*— 10.....DIAMOND

Tenacity.

- 11 *Brittle*SIDERITE
- 12 *Tough*EMERY
- 13 *Highly sectile.* CERARGYRITE
- 14 *Imperfectly* " ALABASTER
- 15 *Malleable*COPPER
- 16 *Flexible*ITACOLUMYTE
- 17 *Elastic*MUSCOVITE

Fusibility, etc.

- 18 *F.*— 1.....STIBNITE
- 19 *F.*— 2.....NATROLITE
- 20 *F.*— 3.....ALMANDITE
- 21 *F.*— 4.....ACTINOLITE
- 22 *F.*— 5.....ORTHOCLASE
- 23 *F.*— 6.....BRONZITE
- 24 *Magnetism*....LODESTONE
- 25 *Streak*.....HONESTONE

Structure, Cleavage, Taste, Etc.

Nos. 95A and 95B.

Structure.

- 26 *Bladed*CYANITE
- 27 *Columnar*GYPSUM
- 28 *Fibrous*CHRYSOTILE
- 29 *Reticulated* ... CERUSSITE
- 30 *Stellated*PYROPHYLLITE
- 31 *Radiated*TOURMALINE
- 32 *Curved Folia.* TALC
- 33 *Straight* " ..BIOTITE

- 34 *Coarse Gran.* . PYROXENE
- 35 *Fine* " . MARBLE
- 36 *Compact* CHALK
- 37 *Friable* SINTER
- 38 *Reniform* HEMATITE
- 39 *Mammillary* .. CHALCEDONY
- 40 *Globular* PISOLITE
- 41 *Nodular* MENILITE
- 42 *Amygdaloidal* . THOMSONITE
- 43 *Coralloidal* ... FLOS FERRI
- 44 *Dendritic* COPPER
- 45 *Mossy* CALC TUFFA
- 46 *Capillary* JAMESONITE
- 47 *Acicular* ARAGONITE
- 48 *Drusy* QUARTZ
- 49 *Stalactitic* STALACTITE
- 50 *Amorphous* ... DEWEYLITE

Cleavage.

- 51 *Cubic* GALENA
- 52 *Octahedral* ... FLUORITE
- 53 *Dodecahedral* . SPHALERITE
- 54 *Basal* MUSCOVITE
- 55 *Prismatic* AMPHIBOLE
- 56 *Rhombohedral* CALCITE
- 57 *Pinacoidal* ... GYPSUM

Fracture.

- 58 *Conchoidal* ... SMOKY QUARTZ
- 59 *Even* LITHOGR. ST'N.
- 60 *Uneven* RHODONITE
- 61 *Hackly* FRANKLINITE
- 62 *Earthy* TRIPOLI
- 63 *Splintery* PECTOLITE

Taste.

- 64 *Astringent* ... MELANTERITE
- 65 *Saline* HALITE
- 66 *Alkaline* NATRON
- 67 *Bitter* KAINITE
- 68 *Sour* COQUIMBITE

Odor.

- 69 *Alliaceous* ARSENOPYRITE
- 70 *Sulphurous* ... PYRITE
- 71 *Bituminous* .. ELATERITE

- 72 *Fetid* BARITE
 73 *Argillaceous* .. KAOLIN

Touch.

- 74 *Greasy* GRAPHITE
 75 *Tongue Adheres* . ALLOPHANE

Specific Gravity.

Nos. 97A and 97B.

(The figures given are approximate.)

Unmetallic Luster.

- 76 *G.—1.* COPALITE
 77 *G.—1.6* ULEXITE
 78 *G.—1.9* THAUMASITE
 79 *G.—2.1* OPAL
 80 *G.—2.3* GYPSUM
 81 *G.—2.6* ALBITE
 82 *G.—2.8* PROCHLORITE
 83 *G.—3.* CRYOLITE
 84 *G.—3.2* ANDALUSITE
 85 *G.—3.5* TITANITE
 86 *G.—3.7* STRONTIANITE
 87 *G.—4.* SPHALERITE
 88 *G.—4.3* WITHERITE
 89 *G.—4.7* ZIRCON

Metallic Luster.

- 90 *G.—5.* PYRITE
 91 *G.—5.7* ARSENIC
 92 *G.—6.* ARSENOPIRYTE
 93 *G.—6.2* ALLEMONITE
 94 *G.—6.7* CASSITERITE
 95 *G.—7.5* GALENA
 96 *G.—8.* CINNABAR
 97 *G.—8.9* COPPER
 98 *G.—9.8* BISMUTH
 99 *G.—13.6* MERCURY
 100 *G.—18.* GOLD

Color and Luster.

Nos. 101A and 101B.

*Color.***Metallic Colors.**

- 101 *Tin-White* ... LOLLINGITE
 102 *Lead-Gray* ... MOLYBDENITE
 103 *Brass-Yellow* . CHALCOPYRITE
 104 *Copper-Red* .. COPPER
 105 *Bronze-Yellow* PYRRHOTITE

Non-Metallic Colors.**White.**

- 106 *Snow-White* .. MAGNESITE
 107 *Milk-White* ... QUARTZ
 108 *Greenish-White* TALC
 109 *Yellowish-White* . STALACTITE
 110 *Reddish-White* APOPHYLLITE
 111 *Grayish-White* LIMESTONE

Gray.

- 112 *Yellowish-Gray* BUHRSTONE
 113 *Ash-Gray* ZOISITE
 114 *Greenish-Gray* BYSSOLITE
 115 *Bluish-Gray* .. ANHYDRITE

Black

- 116 *Grayish-Black* . ILMENITE
 117 *Bluish-Black* . CHALCOPHAN
 118 *Greenish-Black* HORNBLende
 119 *Brownish-Black* CANNEL COAL
 120 *Velvet-Black* .. UINTAHITE

Blue.

- 121 *Lavender-Blue* LEPIDOLITE
 122 *Violet-Blue* .. VIOLAN
 123 *Greenish-Blue* AURICHALCITE
 124 *Azure-Blue* ... LAZURITE
 125 *Prussian-Blue* . AZURITE
 126 *Indigo-Blue* .. COVELLITE
 127 *Sky-Blue* CELESTITE

Green.

- 128 *Apple-Green* .. WILLEMITE
 129 *Olive-Green* .. OLIVINE
 130 *Leek-Green* ... VERD ANTIQUE
 131 *Emerald-Green* FLUORITE
 132 *Grass-Green* .. MALACHITE
 133 *Verdigris-Gr'n* . AMAZONSTONE
 134 *Pistachio-Gr'n* . EPIDOTE

Yellow.

- 135 *Sulphur-Yellow* SULPHUR
 136 *Honey-Yellow* CALCITE
 137 *Lemon-Yellow* WULFENITE
 138 *Ochre-Yellow* . OCHRE
 139 *Orange-Yellow* ECDemITE

Red.

- 140 *Rose-Red* ROSE QUARTZ
 141 *Flesh-Red* CHABAZITE

- 142 *Blood-Red* ZINCITE
 143 *Scarlet-Red* ... CROCOITE
 144 *Brick-Red* SEMI-OPAL
 145 *Crimson-Red* . CINNABAR
 146 *Garnet-Red* ... ALMANDITE

Brown.

- 147 *Yellowish-Br'n.* WOOD-OPAL
 148 *Chestnut-Br'n.* GROSSULAR
 149 *Clove-Brown* .. LIMONITE
 150 *Reddish-Brown* JASP. WOOD

Luster.

Kinds of Luster.

- 151 *Metallic* JAMESONITE
 152 *Adamantine* .. ENDLICHITE
 153 *Vitreous* HYALITE
 154 *Resinous* SPHALERITE
 155 *Greasy* ELÆOLITE
 156 *Pearly* DOLOMITE
 157 *Silky* SATIN SPAR

Degrees of Luster.

- 158 *Splendent* HEMATITE
 159 *Shining* DOLOMITE
 160 *Glistening* ... PAPIERSPATH
 161 *Glimmering* .. FLINT

Luster Phenomena.

- 162 *Play of Colors* OPAL
 163 *Change of* " LABRADORITE
 164 *Opalescence* .. MOONSTONE
 165 *Chatoyancy* ... TIGER EYE
 166 *Iridescence* ... COAL
 167 *Dichroism* EPIDOTE
 168 *Tarnish* BORNITE
 169 *Asterism* PHLOGOPITE
 170 *Schiller* SUNSTONE

Diaphaneity.

- 171 *Transparent* .. ROCK CRYSTAL
 172 *Semi-* " .. FLUORITE
 173 *Translucent* .. ALBITE
 174 *Semi-* " .. MEX. ONYX
 175 *D'ble Refract'n* ICELAND SPAR

Effect of Radium, Röntgen and
Ultra-Violet Rays, Heat, Friction and Magnetism.

(NOTE.—The first half of this list is subject to revision.)

Nos. 104A and 104B.

Radium.

- 176 *Phosphorescent* DIAMOND
 177 *Fluorescent* ... WILLEMITE

Röntgen Rays.

- 178 *Fluorescent* ... FLUORITE
 179 *Phosphorescent* ARAGONITE
 180 *Opaque* SULPHUR
 181 *Transparent* .. GRAPHITE

Ultra-Violet Rays.

- 182 *Fluorescent red.* CALCITE
 183 " *Blue.* HYDROZINCITE
 184 " *Green* HYALITE
 185 *Phosphor., Blue* COLEMANITE
 186 " *Green* ... SELENITE
 187 *Opaque* MICA

Heat.

- 188 *Pyro - Electric,*
Terminal Polarity. TOURMALINE
 189 *Pyro - Electric,*
Lateral Polarity .. RUTILE, tetr.
 190 *Pyro - Electric,*
Lateral Polarity .. QUARTZ, hex.
 191 *Thermo-Elect.* PYRITE
 192 *Phosphor. Blue* CHLOROPHANE
 193 " *Red.* LEPIDOLITE

Friction.

- 194 — *Electricity.* AMBER
 195 + " QUARTZ
 196 *Triboluminescent, Red* HEXAGONITE
 197 *Triboluminescent, Yellow* SPHALERITE

Magnetism.

- 198 *Polarity* LODESTONE
 199 *Strongly Magn'c* PYRRHOTITE
 200 *Weakly* " GARNET

Chemical Mineralogy.

Specimens for Blowpipe and Wet Analysis.

(See "Laboratory List" beyond for prices of minerals sold by weight.)

The material selected for these collections is as near chemically pure as the minerals generally occur in nature. All are clean, typical examples of distinct species. The list includes those commonly covered in an elementary course, as recommended by von Kobell, Brush, Dana and others.

No. 119A. BLOWPIPE COLLECTION.

One hundred specimens of pure minerals as listed. Average size, 12 x 9 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ in.), with blocks (bottles or wooden boxes substituted without charge), \$100. Each specimen, averaging 600 cu. cm. volume, may be broken into fragments, affording material for over 500 analyses. Glass case, \$50 extra.

No. 119B. Blowpipe Collection.

One hundred specimens of pure minerals, averaging 7 x 5 cm. ($2\frac{3}{4}$ x 2 in.), with trays, \$25. Each specimen will afford material for over 100 analyses. Drawer cabinet, \$6 extra. According to following list:

Blowpipe Collection List.

<i>Arsenic.</i>		11	ENARGITE
1	REALGAR	12	CUPRITE
2	ORPIMENT	13	MALACHITE
<i>Antimony.</i>		14	AZURITE
3	STIBNITE	15	ATACAMITE
<i>Molybdenum.</i>		16	CHRYSOCOLLA
4	MOLYBDENITE	<i>Lead.</i>	
<i>Gold and Tellurium.</i>		17	GALENA
5	SYLVANITE	18	JAMESONITE
<i>Mercury.</i>		19	PYROMORPHITE
6	CINNABAR	20	VANADINITE
<i>Copper.</i>		21	CERUSSITE
7	CHALCOCITE	22	WULFENITE
8	BORNITE	23	ANGLESITE
9	CHALCOPYRITE	24	CROCOITE
10	TETRAHEDRITE	<i>Tin.</i>	
		25	CASSITERITE
		26	STANNITE

Titanium.

- 27 RUTILE
28 ILMENITE

Iron.

- 29 PYRITE
30 ARSENOPYRITE
31 HEMATITE
32 MAGNETITE
33 FRANKLINITE
34 CHROMITE
35 LIMONITE
36 SIDERITE
37 VIVIANITE

Nickel.

- 38 MILLERITE
39 NICCOLITE
40 PYRRHOTITE

Cobalt.

- 41 SMALTITE
42 COBALTITE
43 ASBOLITE

Manganese.

- 44 PYROLUSITE
45 PSILOMELANE
46 RHODOCHROSITE
47 RHODONITE
48 MANGANITE
49 ALABANDITE

Zinc.

- 50 SPHALERITE
51 ZINCITE
52 CALAMINE
53 SMITHSONITE
54 WILLEMITE
55 HYDROZINCITE

Aluminum.

- 56 CORUNDUM
57 BAUXITE
58 CRYOLITE
59 WAVELLITE
60 KAOLIN
61 ALUNITE
62 PYROPHYLLITE

Calcium.

- 63 FLUORITE
64 CALCITE

- 65 APATITE
66 ANHYDRITE
67 GYPSUM
68 COLEMANITE

Magnesium.

- 69 BRUCITE
70 MAGNESITE
71 DOLOMITE
72 KIESERITE

Barium.

- 73 BARITE
74 WITHERITE

Strontium.

- 75 STRONTIANITE
76 CELESTITE

Lithium.

- 77 LEPIDOLITE
78 AMBLYGONITE

Sodium and Potassium.

- 79 BORAX
80 CARNALLITE

Silicates.

- 81 ORTHOCLASE
82 PYROXENE
83 WOLLASTONITE
84 AMPHIBOLE, Actinolite
85 GARNET, Almandite
86 CLINOCHLORE
87 EPIDOTE
88 TOURMALINE
89 TOPAZ
90 TALC
91 SERPENTINE
92 DATOLITE
93 APOPHYLLITE
94 PECTOLITE
95 NATROLITE
96 STILBITE

Uranium.

- 97 URANINITE
98 CARNOTITE

Tungsten.

- 99 WOLFRAMITE
100 SCHEELITE

Laboratory List.

Pure Minerals Sold by Weight for Analysis and Experiment.

Many minerals can be supplied which are not here listed. Prices are for sample lots and rarely indicate commercial values. Material is usually furnished in several irregular pieces, specimens of uniform size costing more. Where more than 5 per cent. of gangue is attached the approximate percentage of pure mineral is noted. *This is the only list published which thus guarantees quality.* A minimum price of \$0.20 is charged for any mineral sold by weight.

The following rates hold for quantities up to ten kilos. Larger quantities at lower rates. Smaller quantities than one kilo are charged at a rate 25 per cent. higher, proportionately, than the kilo price. (Thus Alabandite \$2 per kilo is \$1.25 per half-kilo.) Ores of the Rare Elements are listed separately. Prices will be furnished when quantities desired are stated.

Comparison of Weights.

1000 grams	= 1 kilogram (K.)	= about	$2\frac{1}{5}$ pounds.
100 "	= 1 hectogram (H.)	= "	$3\frac{1}{2}$ ounces.
10 "	= 1 dekagram (D.)	= "	$\frac{1}{3}$ ounce.
1 gram	(G.)	= "	$15\frac{1}{2}$ grains.

	Per kilo. (2.2 lbs.)		Per kilo. (2 2 lbs.)
Actinolite	\$0.40	Amphibole, Asbestos, gray ..	\$0.40
Agate, banded or moss.....	.50	" Byssolite	1.00
Alabandite	2.00	" Edenite .....	.20
Alabaster .....	.20	" Hexagonite .....	.60
Albite .....	.20	" Hornblende .....	.20
Allemontite	1.50	" Tremolite .....	.60
Allophane	1.00	Analcite, cryst'd	4.00
Almandite .....	.60	Andalusite	1.50
Alunite .....	.30	Anglesite	2.00
Alunogen	1.00	Anhydrite .....	.20
Amazon Stone, cryst'd .....	.40	Anthophyllite .....	.40
Amber	4.00	Anthracite .....	.20
Amblygonite .....	.70	Antimony	3.00
Amethyst	1.00	Apatite, brown, crystals.....	.40
Amphibole, Actinolite .....	.40	" white, massive .....	.20

	Per kilo (2.2 lbs.)		Per kilo. (2.2 lbs.)
Apatite, Phosphate rock.....	\$0.20	Calc Spar	\$0.20
Apophyllite	2.50	Calc Tufa .....	.20
Aquamarine (per D., \$0.20)		Cancrinite	4.00
Aragonite .....	.30	Cannel Coal .....	.20
Argentite (per D., \$0.30)		Carnallite .....	.30
Arkansite, paramorph	1.50	Cassiterite, massive .....	.60
Arsenic	1.80	“ Stream Tin .....	.60
Arsenopyrite .....	.20	Caswellite	1.00
Asbestos, Amphibole, gray... .	.40	Celestite, cleavage .....	.20
“ “ white	1.00	Cerargyrite (per D., \$0.30)	
“ Chrysotile	1.00	Cerussite, gray, mass.....	.80
Asbolite	1.00	“ white, cryst'd	1.60
Asphaltum .....	.20	Cervantite.....	.50
Atacamite	4.00	Chabazite	2.00
Augite, crystals	1.00	Chalcedony .....	.50
Aventurine Feldspar—see		Chalcocite .....	.70
Sunstone.		Chalcophanite	1.00
Axinite, yellow or brown....	1.00	Chalcopyrite .....	.40
Azurite	1.00	Chalk .....	.20
Barite .....	.20	Chloanthite	2.00
Bauxite .....	.20	Chlorite .....	.40
Beryl, green or yellow.....	.40	Choritoid, var. Masonite....	.30
“ Aquamarine (per D., \$0.20)		Chlorophyllite .....	.30
Biotite .....	.40	Chromite .....	.20
Bismuth	6.00	Chrysocolla	1.00
Bismuthinite	6.00	Chrysolite .....	.30
Bituminous Coal .....	.20	Chrysotile, Asbestos	1.00
Blende .....	.20	Cinnabar	2.00
Boleite, cry'ls (per D., \$0.90)		Cinnamon Stone .....	.60
Boracite .....	.50	Cleavelandite .....	.20
Borax .....	.50	Clinochlore	1.00
Bornite, argentif.	1.50	Coal, Anthracite .....	.20
Boulangerite	1.50	“ Bituminous .....	.20
Bournonite	6.00	“ Brown .....	.20
Braunite .....	.50	“ Cannel .....	.20
Bronzite .....	.40	Cobaltite	2.50
Brookite, paramorph	1.50	Coccolite .....	.20
Brown Coal .....	.20	Colemanite .....	.50
Brucite	2.00	Copalite	2.50
Byssolite	1.00	Copper, native .....	.60
Calamine .....	.40	“ glance .....	.70
Calcite, cleavage .....	.20	“ Pyrites .....	.40
“ crystals .....	.40	Cordierite	3.00
“ Chalk .....	.20	Corundum, sharp cleavages or	
“ Iceland Spar, good... .	2.00	rough crystals	1.00
“ “ “ clear ..	4.00	Corundum, Sapphire (per D.,	
“ Limestone .....	.20	\$2.00)	
“ Marble .....	.20	Corundum, Ruby (per D.,	
“ Mexican Onyx .....	.30	\$2.00)	
“ siliceous, crystals....	.40	Corundum, Emery .....	.20

	Per kilo. (2.2 lbs.)		Per kilo. (2.2 lbs.)
Covellite	\$2.00	Gypsum, granular	\$0.20
Crocidolite, unaltered	1.00	“ coarsely fibrous.....	.20
“ altered to Quartz. ....	.50	“ Alabaster, best white ..	.20
Croccite, crystals	3.00	“ Satin Spar .....	.50
Cryolite .....	.40	“ Selenite, clear color-	
Cuprite	1.50	less cleavage .....	.30
Cyanite .....	.30	Halite, granular .....	.20
“ transparent crystals		“ transparent .....	.40
(per D., \$0.30)		Halloysite	1.00
Cylindrite	3.00	Halotrichite	2.00
Datolite	2.00	Hardystonite .....	.60
Dendritic Agate .....	.50	Hausmannite .....	.30
Deweylite	1.00	Heavy Spar .....	.20
Diaspore	2.00	Heliotrope	2.00
Dolomite .....	.20	Hematite, compact .....	.20
Domeykite Stibio-domeykite..	4.00	“ cryst'd .....	.40
Dufrenite	1.00	“ micaceous .....	.20
Dyscrasite (per D., \$0.70)		“ oölitic .....	.20
Edenite .....	.20	“ Pencil Ore .....	.70
Elæolite .....	.50	Heulandite	3.00
Elaterite	1.00	Hexagonite .....	.60
Embolite (per D., \$0.30)		Hornblende .....	.20
Emery .....	.20	Horn Silver (per D., \$0.30)	
Enargite	1.00	Iceland Spar, good.....	2.00
Enstatite .....	.30	“ colorless	4.00
Epidote .....	.50	Idocrase .....	.50
Feldspar, Potash—see Ortho-		Infusorial Earth .....	.20
clase.		Iolite, Cordierite	3.00
Feldspar, Soda—see Albite.		“ Chlorophyllite .....	.30
Fibrolite .....	.40	Iridosmine (per D., \$9.00)	
Fire Opal	9.00	Iron, meteoric, shavings	1.00
Flexible Sandstone .....	.20	“ terrestrial, fragments..	2.00
Fluorite, white granular ....	.20	“ Pyrites .....	.20
“ pink, green or blue		Itacolumyte .....	.20
translucent cleavages ....	.60	Jade (Nephrite)	4.00
Fowlerite .....	.40	Jamesonite	1.50
Franklinite .....	.40	Jasper .....	.60
Galena, cleavable .....	.30	Jasperized Wood .....	.30
“ argentiferous .....	.50	Jefferisite .....	.60
Garnet .....	.60	Jeffersonite .....	.40
Garnierite	1.50	Kainite .....	.30
Gilsonite .....	.20	Kaolinite .....	.20
Gold Quartz (Rand cong.)..	.50	Kieserite .....	.30
Gold Ore (Telluride).....	1.00	Labradorite, chatoyant ....	.60
Goslarite	2.00	“ ordinary .....	.30
Göthite .....	.60	Lapis Lazuli	5.00
Graphite .....	.50	Lazurite	5.00
Gray Copper, argentif.....	1.00	Lepidolite .....	.20
Griphite	1.00	Lignite .....	.20
Grossularite .....	.60	Limestone .....	.20

	Per kilo. (2.2 lbs.)		Per kilo. (2.2 lbs.)
Limonite, various	\$0.20	Pectolite	\$1.00
“ Yellow Ochre ....	.20	Perthite, Sunstone .....	.40
Lithiophilite .....	.50	Petalite	1.00
Lodestone, ordinary .....	.50	Petrified Wood .....	.30
“ extra strong	1.50	Petroleum .....	.20
Ludwigite	1.00	Phlogopite .....	.40
Magnesite .....	.20	Phosphate Rock .....	.20
Magnetite—see Lodestone ..	.20	Piedmontite	1.00
Malachite	1.00	Pisolate .....	.70
Manganite .....	.40	Platinum (per D., \$9.00)	
Marble .....	.20	Plumbago .....	.50
Marcasite	1.00	Polyhalite .....	.40
Martite, cryst'd	1.00	Prehnite .....	.80
Masonite .....	.30	Prochlorite .....	.40
Massicot (per D., \$0.30)		Proustite (per D., \$0.60)	
Meerschaum	2.00	Psilomelane .....	.20
Melanterite	1.20	Pyrrargyrite (per D., \$0.60)	
Menilite .....	.40	Pyrite .....	.20
Mexican Onyx .....	.30	Pyrolusite .....	.20
Mica, various .....	.40	Pyromorphite, cryst'ne	3.00
Micaceous Hematite .....	.20	Pyrophyllite	1.00
Microcline, Amazon Stone ..	.40	Pyroxene, Augite crystals ...	1.00
Milky Quartz .....	.20	“ Coccilite .....	.20
Millerite	2.50	“ Jeffersonite .....	.40
Mispickel .....	.20	Pyrrhotite .....	.20
Moss Agate (dendritic) ....	.50	Quartz, Agate .....	.50
Muscovite .....	.40	“ Amethyst	1.00
Nadorite	4.00	“ auriferous conglom. ....	.50
Natrolite	4.00	“ Chalcedony .....	.50
Nephelite, Elæolite .....	.50	“ Flexible Sandstone .	.20
Nephrite, Jade	4.00	“ Flint .....	.20
Newberyite (per D., \$0.20)		“ Jasper .....	.60
Niccolite	2.50	“ Jasperized Wood....	.30
Niter, Soda .....	.20	“ Milky .....	.20
Ochre, yellow .....	.20	“ Moss Agate, dendritic .	.50
Oligoclase	2.00	“ Rock Crystal	1.50
Olivine, Chrysolite .....	.30	“ Rose—see Rose Quartz.	
Onyx, Mexican .....	.30	“ Smoky .....	.20
Opal, Fire	9.00	Realgar	2.00
“ Precious (according to		Rhodochrosite	1.00
variety of colors. Per D.,		Rhodonite .....	.40
\$0.20 to \$1.00)		Ripidolite	1.00
Opal, Semi (common) .....	.50	Rock Crystal, transparent...	1.50
“ Tripoli .....	.20	Rose Quartz, pale pink.....	.40
“ Menilite .....	.40	“ “ deep “	1.00
“ Wood .....	.50	Rubellite, crystals	2.00
Orpiment	2.00	Ruby (per D., \$2.00)	
Orthoclase, Common Feldspar	.20	Ruby Silver (per D., \$0.60)	
Osmiridium (per D., \$9.00)		Salt, Rock—see Halite.	
Ozocerite .....	.40	Sandstone, Flexible .....	.20

	Per kilo. (2.2 lbs.)		Per kilo. (2.2 lbs.)
Sapphire (per D., \$2.00)		Sylvite	\$0.50
Satin Spar	\$0.50	Talc, foliated .....	.30
Scapolite .....	.60	“ Steatite .....	.20
Selenite, clear cleavages ....	.30	Tasmanite	1.00
Sepiolite, Meerschaum	2.00	Tetradymite (per D., \$0.30)	
Serpentine, common .....	.20	Tetrahedrite, argentif.	1.00
“ Chrysotile, Asbestos	1.00	Thaumasite .....	.50
“ Williamsite .....	.40	Tiger Eye .....	.50
“ Verde Antique ....	.40	Topaz .....	.50
Siderite .....	.20	Tourmaline, black .....	.40
Siliceous Calcite .....	.40	“ brown .....	.60
Sillimanite .....	.40	“ green, crystals..	6.00
Silver-bearing Quartz.....	.50	“ Rubellite, “ ..	2.00
Smaltite	2.50	Tremolite .....	.60
Smithsonite .....	.50	Triphylite	1.20
Smoky Quartz .....	.20	Triplite	3.00
Soapstone .....	.20	Tripolite .....	.20
Sodalite	1.00	Uintahite .....	.20
Soda Niter .....	.20	Ullmannite	1.50
Sperryllite (per D., \$9.00)		Verde Antique .....	.40
Sphalerite, cleavable .....	.20	Vesuvianite .....	.50
“ fibrous .....	.20	Vivianite	6.00
“ white granular ..	.40	Wad .....	.20
Spodumene .....	.40	“ Asbolite	1.00
Stannite	1.50	Wavellite	1.00
Staurolite	2.00	Wernerite, lilac .....	.60
Steatite .....	.20	Willemite .....	.50
Stephanite (per D., \$0.70)		Williamsite .....	.40
Stibio-domeykite	4.00	Witherite .....	.20
Stibnite .....	.40	Wollastonite .....	.40
Stilbite .....	.70	Yellow Ochre .....	.20
Stream Tin .....	.60	Zinc Blende .....	.20
Strontianite .....	.20	Zincite	1.00
Succinite	4.00	“ with Franklinite, etc..	.60
Sulphur .....	.40	Zoisite .....	.80
Sunstone, Perthite .....	.40		

Rare Metal Minerals.

The increasing commercial importance of the rare elements and the active demand for them among experimenters and electro-chemists has led to wide fluctuations in value. Their ores are therefore excluded from the general laboratory price list. The following are the most important in stock although some others are occasionally procurable. Prices will be furnished to those stating quantities desired. Large or small lots supplied.

Æschynite	Euxenite	Rutile, best red
Allanite	Fergusonite	Samarskite
Argyrodite	Gadolinite	Scheelite
Autunite	Gummite	Tantalite
Bastnasite	Hielmite	Thorite
Beryl	Hubnerite	Titanite
Beryllonite	Ilmenite	Torbernite
Brookite	Keilhauite	Uraninite
Carnotite	Microlite	Uranophane
Cerite	Molybdenite	Vanadinite
Cleveite	Monazite, crystals	Wolframite
Columbite	Monazite Sand	Wulfenite
Cyrtolite	Orangite	Xenotime
Descloizite	Pollucite	Yttrotantalite
Dysanalyte, crystals	Rutile, ordinary red or	Zircon
Endlichite	black (2% to 3% iron)	



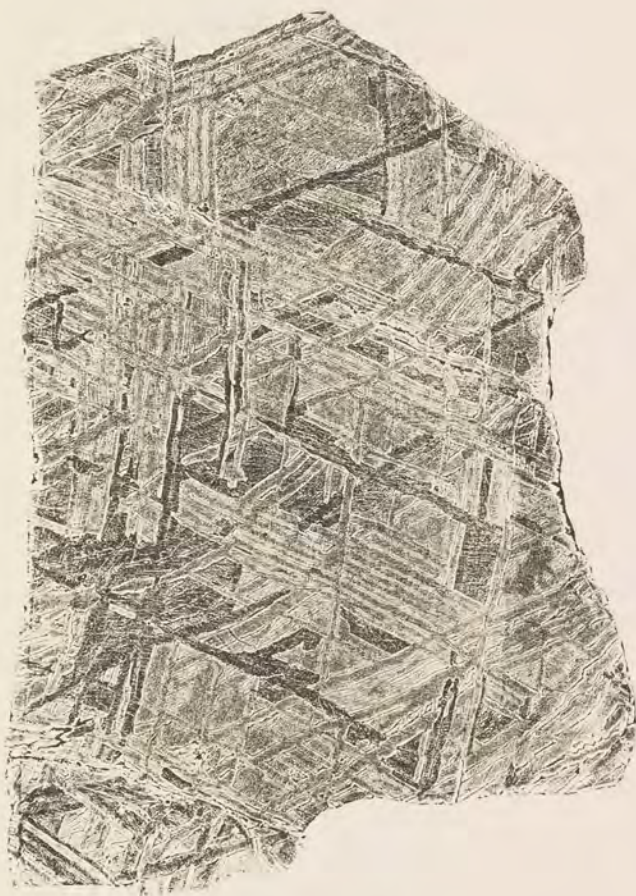


PLATE XV.

THE SACRAMENTO MOUNTAINS METEORITE.

The above Print was made direct from a Polished Slab, etched with Acid to show Crystalline Structure, or "Widmannstatten Figures."

Price List of Individual Specimens

OF THE

Commoner Minerals, Including the Kinds Used in Elementary Study.

(NOTE.—An extensive price list of individual specimens is given in the Complete Mineral Catalog.)

STUDENT'S SIZE SPECIMENS furnished at list prices.

MUSEUM SIZE SPECIMENS cost quadruple the list price.

INTERMEDIATE SIZES cost in proportion to volume.

SMALLER SIZES cost the same as the student's size, except in stated quantities of ten or more of one kind, when lower prices can be quoted on request.

Those who already possess a partial collection, or who for other reasons do not care for one of our regular collections, will find the following list useful in ordering. Specimens purchased in this way cost more than if bought in a cataloged collection, as the latter are economically prepared, a number at a time, thus saving about 15 per cent.

Unless otherwise noted the specimens are usually pure, massive and about 7 x 5 x 4 cm. ($2\frac{3}{4}$ x 2 x $1\frac{1}{2}$ in.), the standard Student's Size. The standard Museum or Exhibition Size, 12 x 9 x 7 cm. ($4\frac{3}{4}$ x $3\frac{1}{2}$ x $2\frac{3}{4}$ in.), has about five times the volume of the Student's Size and costs four times as much as the list price.

The names in italics are those comprising the Normal or High School Collection. In general, they are the most important in the list for the average course in Elementary Mineralogy.

UNDERSIZED SPECIMENS are generally marked by a cross (+).

THE APPROXIMATE PER CENT. (%) of massive mineral (not metal) in matrix is generally marked after such as are mixed with associated mineral or gangue rock. According as the stock varies from time to time, undersized pure specimens are substituted for those listed as standard size impure.

CRYSTALLIZED SPECIMENS, marked "cryst'd," are in groups, often with gangue. Those marked "crystal" or "crystals" are loose. For complete list of crystals, see section on Crystallography.

These prices are often only approximate, but will average right if a number of specimens are purchased.

<i>Actinolite</i> , cryst'd.....	\$0.15	+ <i>Borax</i> , crystal.....	\$0.20
<i>Alabaster</i> .....	.10	<i>Bornite</i> , 25% .....	.30
<i>Albite</i> , Cleavelandite, cryst'ne. .	.10	<i>Bournonite</i> , cryst'd.....	.50
<i>Albite</i> , Moonstone, " .....	.20	<i>Braunite</i> .....	.35
<i>Albite</i> , Pericline, cryst'd....	.40	<i>Brookite</i> , Arkansite, cryst'd..	.40
<i>Allophane</i> .....	.25	<i>Brucite</i> , cleavage .....	.30
<i>Alunite</i> .....	.10	<i>Calamine</i> , cryst'd .....	.25
<i>Alunogen</i> .....	.15	<i>Calcite</i> , " hexagonal ..	.50
<i>Amblygonite</i> .....	.20	<i>Calcite</i> , " yellow .....	.15
<i>Amphibole</i> , <i>Actinolite</i> , cr'd..	.15	<i>Calcite</i> , <i>Calc Tufo</i> .....	.10
<i>Amphibole</i> , <i>Asbestos</i> .....	.15	<i>Calcite</i> , Chalk .....	.10
+ <i>Amphibole</i> , <i>Hornblende</i> , cr'd. .	.30	<i>Calcite</i> , Hydraulic Limestone. .	.10
<i>Amphibole</i> , " massive. .	.10	<i>Calcite</i> , <i>Iceland Spar</i> .....	.30
<i>Amphibole</i> , <i>Tremolite</i> , cr'd..	.20	<i>Calcite</i> , Lithographic Stone..	.10
<i>Analcite</i> , cryst'd.....	.40	<i>Calcite</i> , <i>Marble</i> , pol.....	.20
<i>Andalusite</i>, " .....	.20	<i>Calcite</i> , <i>Mexican Onyx</i> , pol... .	.30
+ <i>Anglesite</i> , cryst'd .....	.50	<i>Calcite</i> , <i>Papierspath</i> .....	.50
<i>Anhydrite</i> .....	.10	<i>Calcite</i> , <i>Stalactite</i> .....	.20
<i>Anorthite</i> , 25% .....	.30	<i>Cannel Coal</i> .....	.10
+ <i>Anorthite</i> , crystal .....	.50	<i>Carnallite</i> .....	.15
<i>Anthracite Coal</i> .....	.10	<i>Cassiterite</i> , cryst'd .....	.50
+ <i>Antimony</i> , cryst'ne .....	.40	<i>Cassiterite</i> , disseminated 10% .	.10
<i>Apatite</i> , crystal .....	.20	<i>Cassiterite</i> , <i>Stream Tin</i> .....	.25
<i>Apatite</i> , massive .....	.15	<i>Celestite</i> , cryst'd .....	.50
" <i>Phosphate Rock</i> ...	.10	<i>Celestite</i> , massive .....	.10
<i>Apophyllite</i> , cryst'd .....	.40	<i>Cerargyrite</i> , 5% .....	.40
+ <i>Aragonite</i> , crystals .....	.30	<i>Cerussite</i> , cryst'd .....	.50
<i>Aragonite</i> , <i>Flos-ferri</i> .....	.20	<i>Cerussite</i> , massive .....	.30
+ <i>Argentite</i> , 25% .....	.40	<i>Chabazite</i> , cryst'd .....	.25
<i>Arsenic</i> , 25% .....	.40	<i>Chalcocite</i> .....	.30
<i>Arsenopyrite</i> .....	.10	<i>Chalcopyrite</i> , cryst'd .....	.20
<i>Asbestos</i> —see <i>Amphibole</i> and <i>Serpentine</i> .		<i>Chalcopyrite</i> , massive .....	.20
<i>Asphaltum</i> .....	.10	<i>Chromite</i> .....	.10
<i>Atacamite</i> , cryst'd .....	.30	<i>Chrysocolla</i> .....	.25
<i>Augite</i> —see <i>Pyroxene</i> .		<i>Chrysolite</i> , <i>Olivine</i> .....	.10
<i>Aulunite</i> , cryst'd .....	.50	<i>Cinnabar</i> , 25% .....	.40
<i>Azurite</i>, " .....	.50	<i>Clinocllore</i> .....	.20
<i>Azurite</i> , massive .....	.30	<i>Coal</i> , various .....	.10
+ <i>Barite</i> , crystal, blue .....	.30	<i>Cobaltite</i> , cryst'd, 25% .....	.30
<i>Barite</i> , cryst'd, yellow .....	.30	<i>Colemanite</i>, " .....	.50
" cryst'ne .....	.10	<i>Columbite</i>, " .....	.30
<i>Bauxite</i> .....	.10	<i>Copalite</i> .....	.20
<i>Beryl</i> , crystal .....	.30	<i>Copper</i> , disseminated, in con- glomerate, 20% .....	.10
<i>Beryl</i> , massive .....	.10	<i>Copper Pyrites</i> —see <i>Chalco- pyrite</i> .	
<i>Biotite</i> , sheet .....	.10	<i>Corundum</i> , cryst'd .....	.20
<i>Bismuth</i> , 10% .....	.50	<i>Corundum</i> , <i>Emery</i> .....	.10
<i>Bismuthinite</i> , 15% .....	.50	<i>Crocoite</i> , cryst'd .....	.50
<i>Bituminous Coal</i> .....	.10	<i>Cryolite</i> .....	.15
<i>Blende</i> —see <i>Sphalerite</i> .		<i>Cuprite</i> , cryst'd .....	.50
<i>Boracite</i> .....	.20		

Cuprite, Chalcotrichite	\$0.30	Jamesonite, 33%	\$0.30
“ massive, 25% .....	.20	Kaolinite .....	.10
Cyanite, cryst'ne .....	.20	Labradorite, chatoyant .....	.15
Datolite, cryst'd .....	.20	Lead, native, coating.....	.20
+Diamond, crystal .....	.50	Lepidolite .....	.10
+Diopase .....	.50	Limonite .....	.10
Dolomite, Pearl Spar, cryst'd ..	.15	Limonite, Yellow Ochre ....	.10
Doiomite, massive .....	.10	+Linnæite, cryst'd .....	.50
Elæolite .....	.15	Lodestone .....	.25
+Embolite, cryst'd .....	.50	Magnesite .....	.10
Enargite .....	.50	Magnetite, cryst'd .....	.20
Endlichite, cryst'd .....	.30	Magnetite, granular .....	.10
Enstatite, Bronzite .....	.15	Magnetite, Lodestone .....	.25
Epidote, cryst'd .....	.20	Malachite, capillary .....	.20
+Erythrite, “ .....	.50	Malachite, massive .....	.30
Flos-ferri .....	.20	Manganite, cryst'ne .....	.20
Fluorite, cryst'd .....	.20	Marcasite .....	.20
Fluorite, green cleavage.....	.30	Melanterite .....	.30
Fluorite, white, massive.....	.10	Menaccanite .....	.10
Fowlerite, cryst'ne .....	.30	Mercury .....	.50
Franklinite, cryst'd .....	.50	Meteoric Iron, etched.....	.20
Franklinite, granular .....	.20	+Millerite, cryst'ne .....	.30
Galena, cryst'd .....	.35	Mimetite, cryst'd .....	.50
Galena, cleavage .....	.25	Mispickel .....	.10
Galena, argentif. ....	.50	Molybdenite, cryst'd .....	.20
Garnet, Almandite, cryst'd ..	.20	Monazite sand .....	.15
Garnet, Grossularite, “ ..	.20	Microcline, Amazon Stone, cr'l.	.25
Garnierite .....	.30	Muscovite, crystal .....	.30
Genthite, 5% .....	.20	“ sheet .....	.10
Gold, disseminated grains....	.50	Natrolite, cryst'd .....	.30
Gold, disseminated microscop-		Nephelite, Elæolite .....	.15
ically, Transvaal ore, $\frac{3}{4}$ oz.		Niccolite, 25% .....	.40
Au to ton .....	.20	+Octahedrite, cryst'd .....	.50
+Gold, dust .....	.50	Oligoclase .....	.15
Göthite, cryst'ne .....	.25	Olivine .....	.10
Graphite .....	.15	Opal, fire .....	.20
Gypsum, Alabaster .....	.10	Opal, green .....	.25
Gypsum, Satin Spar .....	.20	Opal, precious .....	.50
Gypsum, Selenite, cleavage..	.10	Opal, Tripolite .....	.10
Gypsum, Selenite, crystal ...	.20	Opal, Wood .....	.20
Halite, transp., cleavage.....	.10	Orpiment .....	.50
Halite, granular .....	.10	Orthoclase, cleavage .....	.10
Halloysite .....	.30	Orthoclase, cryst'd .....	.30
Hematite, cryst'd .....	.30	+Orthoclase, crystal, Baveno tw.	.30
Hematite, massive .....	.10	+ “ “ Carlsbad “ ..	.20
Hematite, Pencil Ore .....	.30	Pearl Spar .....	.15
Heulandite, cryst'd .....	.30	Pectolite .....	.20
Hornblende—see Amphibole.		Petrified Wood .....	.20
Iceland Spar .....	.30	Petroleum, crude .....	.10
Ilmenite .....	.10	Phillipsite, cryst'd .....	.50
+Iron, meteoric, etched.....	.20	Phlogopite .....	.10

<i>Platinum</i>	\$0.50	<i>Sillimanite</i>	\$0.15
<i>Polyhalite</i> .....	.15	+ <i>Silver, cryst'd</i> .....	.50
<i>Psilomelane</i> .....	.10	<i>Silver, disseminated grains...</i>	.30
<i>Prehnite</i> .....	.20	+ <i>Smaltite</i> .....	.50
<i>Prochlorite</i> .....	.10	<i>Smithsonite</i> .....	.20
<i>Proustite, 2%</i> .....	.50	<i>Sodalite, 20%</i> .....	.20
<i>Pyrrargyrite, 2%</i> .....	.50	<i>Soda Nitre</i> .....	.10
<i>Pyrite, cryst'd</i> .....	.25	<i>Specular Ore—see Hematite.</i>	
<i>Pyrite, massive</i> .....	.10	<i>Sphalerite, cryst'd, black....</i>	.20
+ <i>Pyrite, altered, crystal</i> .....	.25	<i>Sphalerite, cryst'd, brown....</i>	.20
<i>Pyrolusite</i> .....	.10	<i>Sphalerite, cryst'd, ruby....</i>	.20
<i>Pyromorphite, cryst'd</i> .....	.20	<i>Spinel, cryst'd</i> .....	.25
<i>Pyrophyllite</i> .....	.25	<i>Spodumene</i> .....	.15
<i>Pyroxene, Augite, cryst'd....</i>	.30	<i>Stannite, 50%</i> .....	.30
<i>Pyroxene, Coccolite</i> .....	.10	+ <i>Staurolite, twin crystals....</i>	.20
+ <i>Pyroxene, Diopside, crystal..</i>	.20	<i>Stibnite</i> .....	.20
<i>Pyroxene, Salite</i> .....	.20	<i>Stilbite, cryst'd</i> .....	.20
<i>Pyrrhotite</i> .....	.10	<i>Stream Tin</i> .....	.25
<i>Quartz, Agate, pebbles</i> .....	.15	<i>Strontianite</i> .....	.10
<i>Quartz, " pol.</i> .....	.40	<i>Sulphur, cryst'd</i> .....	.20
<i>Quartz, Amethyst</i> .....	.30	+ <i>Sylvanite, 1%</i> .....	.50
<i>Quartz, Chalcedony</i> .....	.20	<i>Sylvite</i> .....	.15
+ <i>Quartz, cont'g liquid, crystal.</i>	.50	<i>Talc</i> .....	.10
<i>Quartz, Drusy, Geode</i> .....	.10	<i>Tetrahedrite, cryst'd....</i>	.50
<i>Quartz, Flint</i> .....	.10	<i>Tetrahedrite, massive, 25%..</i>	.20
<i>Quartz, Itacolumyte</i> .....	.10	<i>Thomsonite</i> .....	.30
<i>Quartz, Jasper</i> .....	.15	<i>Titanite</i> .....	.30
<i>Quartz, Jasperized wood, pol.</i>	.40	<i>Topaz, crystals</i> .....	.15
<i>Quartz, " " rough</i> .....	.15	+ <i>Torbernite, cryst'd</i> .....	.50
<i>Quartz, Milky</i> .....	.10	<i>Tourmaline, black, cryst'd...</i>	.20
<i>Quartz, Moss Agate</i> .....	.15	<i>Tourmaline, green, crystals..</i>	.50
<i>Quartz, Rock Crystal</i> .....	.20	<i>Tourmaline, Rubellite, cr'd...</i>	.20
<i>Quartz, Rose</i> .....	.15	+ <i>Triphylite</i> .....	.30
<i>Quartz, Smoky</i> .....	.10	<i>Turquoise, 5%</i> .....	.30
<i>Realgar</i> .....	.50	+ <i>Uraninite, 25%</i> .....	.50
<i>Rhodochrosite</i> .....	.15	<i>Vanadinite, cryst'd</i> .....	.30
<i>Rhodonite, massive</i> .....	.15	<i>Vesuvianite</i> .....	.20
<i>Rhodonite, Fowlerite</i> .....	.15	<i>Vivianite, cryst'd</i> .....	.50
+ <i>Rutile, red, crystals</i> .....	.30	<i>Wavellite, 25%</i> .....	.20
<i>Rutile, twin " " " " " "</i>	.50	<i>Wernerite</i> .....	.15
<i>" " Nigrine</i> .....	.15	<i>Willemite</i> .....	.25
<i>Satin Spar</i> .....	.20	<i>Witherite</i> .....	.10
<i>Scapolite</i> .....	.15	<i>Wolframite</i> .....	.50
+ <i>Scheelite</i> .....	.50	<i>Wollastonite</i> .....	.20
<i>Selenite</i> .....	.20	<i>Wulfenite, cryst'd, red....</i>	.50
<i>Sepiolite</i> .....	.50	<i>Wulfenite, cryst'd, yellow....</i>	.30
<i>Serpentine</i> .....	.10	<i>Yellow Ochre</i> .....	.10
<i>Serpentine, Chrysotile</i> .....	.25	<i>Zinc Blende—see Sphalerite.</i>	
<i>Serpentine Verde antique, pol.</i>	.30	<i>Zincite, 50%</i> .....	.30
<i>Siderite, cryst'd</i> .....	.25	+ <i>Zircon, crystals</i> .....	.15
<i>Siderite, massive</i> .....	.10	<i>Zoisite, 50%</i> .....	.20



“Complete Mineral Catalog.”

LATEST EDITION.

The most up-to-date compilation of the kind in print.

“*The Metallic Classification*” under each metal heading shows every mineral carrying such metal. Sub-divisions give the combination in which the metal occurs.

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A volume which has won the commendation of thousands. Contains over 200 pages of useful data for all interested in pure or applied mineralogy.

Prices, postpaid, to any address: Paper, \$0.25; bound in flexible cloth, \$0.50.

Minerals Purchased or Exchanged.

While most of our stock is acquired through personal collecting, we also buy of collectors, mining men or others, who can supply specimens direct from localities. Three classes of minerals are wanted:

1. **CABINET SPECIMENS** of finely crystallized or rare minerals. They should show as large and perfect crystals as are obtainable. In the case of very rare compounds and such as do not crystallize, sometimes occurring as "pocket ores," massive specimens are valuable. Quality and perfection of crystals, or rarity, less often size or weight, determine values. No list can be furnished of this class of desiderata, as even slight variations are desired of minerals already largely represented in our stock.

2. **STUDY SPECIMENS.** When an opportunity is presented to improve the stock of any mineral, we usually lay in quantities varying between 200 and 2,000 pounds. They are paid for by weight when quality varies but little. Where they so occur, they are preferred crystallized. Pure massive material is wanted of many minerals used in laboratory work. Gangue specimens of the same minerals are useful as illustrating their associations. This becomes necessary with very valuable ores, where a small percentage of pure mineral in matrix is preferred to a free fragment.

3. **LOOSE CRYSTALS** of every kind bought by the hundred, by the thousand, or by weight.

OLD COLLECTIONS purchased for cash.

METEORITES wanted at good prices.

MAIL-SAMPLES, with exact locality, should accompany all offers, as no order can be given before seeing them. They may weigh about one or two ounces each, and show good crystallization when possible.

PAYMENT on delivery, at figures much above ore value.

PERFECTION OF CRYSTALLIZATION. The protection of crystals from scratches or bruises is imperative. A perfect crystal is worth two to ten times as much as one that has been broken or otherwise damaged in collecting or shipping.

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Introduction to Previous Edition.

The COMPLETE MINERAL CATALOG has been compiled with the double purpose of advertising our business, and of gathering together valuable information for our own and others' use. It is larger than former catalogs, and we believe better arranged. The first part is taken up with a descriptive price-list of cabinet specimens and collections; the second with lists and tables of reference. With the rearrangement of the various collection lists to keep pace with new discoveries in mineralogy, it is hoped that the requirements of class and self-instruction are met to even a greater extent than before. Care has been exercised to give a just and accurate description of the various specimens offered for sale.

The engravings are another new feature, having been prepared expressly for this volume under our direct supervision, in the hope that artistic and scientifically exact illustrations might be obtained.

The idea of publishing a short table based on Dana's classification originated in 1876, and our catalog, which appeared in that year, contained the first "Table of Species." The large sale which this first edition and succeeding reprints met with; the approval everywhere won for it among scientists and educators, has led to the preparation of an entirely new table according to the last edition of Dana. As now presented, it states concisely the composition and form of each species, with a proper classification of its varieties. As before, an index and also a supplement are added. We have found a constant need in our work, of a classification of minerals according to their metallic constituents, showing at a glance what minerals contain given metals. Its usefulness was so manifest, that the lack of any complete list of the kind, led to the compilation of the one now published for the first time.

A WORD AS TO OUR BUSINESS. We supply institutions, teachers, students and professional men, with type specimens for study and reference. In the filling of these orders we draw from an enormous stock of minerals, which has been steadily increasing in volume and scope since the nucleus—Dr. Foote's private cabinet—was exhibited at St. Louis in 1875. The expansion of this great collection has been along lines indicated by the demand for good teaching material. The other important department secures through correspondence and personal collecting, newly-discovered species, or unique and choice examples of the familiar minerals, which are in demand among museums and private collectors.

* * * *

**Rare Minerals for Technological and Industrial Purposes Supplied in
Quantity to Manufacturers, Chemists and Experimenters.**

Rare Element Minerals

In Large Quantity at Commercial Prices for the Use of
Manufacturers, Chemists and Experimenters

The increasing use of the following ores in manufacturing processes, has led us to extend our connections with sources of supply in all parts of the world. While these facilities for commercially supplying rare elements are unrivalled, our experts are sent, if necessary, to distant countries, where the demand warrants such expenditure. The fluctuations in market values do not permit a published price list. Prices will be quoted to those stating quantities desired. Large or small lots supplied.

(For reference purposes, the list of minerals under each metal is made fairly complete. Not all of these are commercially available.)

BERYLLIUM—Beryllonite, Beryl.

CAESIUM—Pollucite.

CERIUM—Bastnasite, Aeschynite, Fergusonite, Samarskite, Monazite, Cerite, Allanite.

DIDYMIUM and LANTHANUM—Bastnasite, Aeschynite, Samarskite, Monazite.

ERBIUM—Fergusonite, Euxenite, Yttrotantalite, Cyrtolite.

GERMANIUM—Argyrodite.

MOLYBDENUM—Wulfenite, Molybdenite.

NIObIUM—Columbite, Tantalite, Samarskite, Fergusonite, Euxenite, Aeschynite, Dysanalyte, Hielmite, Yttrotantalite, Microlite.

RADIUM—Uraninite, Gummite, Fergusonite, Carnotite, Uranophane, Samarskite, Torbernite, Autunite.

TANTALUM—Tantalite, Microlite, Hielmite, Yttrotantalite, Samarskite, Fergusonite, Columbite.

THORIUM—Orangite, Thorite, Aeschynite, Uraninite, Cleveite, Monazite Sand.

TITANIUM—Rutile, Brookite, Dysanalyte, Titanite, Keilhauite, Euxenite, Aeschynite, Ilmenite.

TUNGSTEN—Scheelite, Wolframite, Hubnerite.

URANIUM—Samarskite, Euxenite, Uranophane, Uraninite, Gummite, Cleveite, Carnotite, Torbernite, Autunite.

VANADIUM—Vanadinite, Endlichite, Descloizite, Carnotite.

YTTRIUM—Thalénite, Fergusonite, Euxenite, Yttrotantalite, Samarskite, Hielmite, Cleveite, Xenotime, Gadolinite.

ZIRCONIUM—Zircon.

CHOICE MINERALS.

Brief Mention of Recent Discoveries and other Interesting Minerals Offered for Sale in Fine Cabinet Specimens.

The following list briefly describes only one portion of our large series of cabinet and museum specimens, namely, the most noteworthy species secured direct from localities, either by correspondence with a local collector, or by personal visit. *Further, all here noted are now represented in our stock* by a series of selected specimens, permitting a good choice in every case. The aim has been to abridge rather than to lengthen this list. It might easily be trebled by the mere enumeration of rarities of which only a few were secured. This unnoticed portion of the stock changes so rapidly, that often the few good representatives of a mineral are sold as soon as advertised. Most of this class, however, are priced in the "*Alphabetical Index and Price List.*"

With a view to more regular and systematic collecting, mineralogists are employed to travel for us. The advantage of such direct communication with distant localities is self-evident. The result has been a general levelling of prices to a standard of values permitted by these economies. Our collector in Australia has met with notable success, affording incomparable examples of the minerals of that country—e. g., the Crocoites, so imperfectly illustrated in this catalog, are classed among the finest crystallizations in nature.

Historical rarities, otherwise unobtainable, are acquired through our purchase of old collections. The rich Trautwine and Howell collections afford examples of this source of supply.

We have discontinued buying of or selling to other general mineral dealers. Customers in all countries can have specimens in lots of \$20 or over, sent them carriage free for selection, and so avoid paying the profits of several retailers.

Your desiderata list, if filed with us, is frequently consulted and the gaps it represents often filled. General instructions as to limitations of size, price and character of specimens, aid in pleasing individual taste.

Prices are for good cabinet specimens in the most perfect crystallizations obtainable. Small pieces for amateurs and beginners may often be had at prices lower than the lowest quoted, while the highest price does not always refer to the best of the kind on hand. Our neat printed labels give correctly, scientific name, composition, form and locality.

American Localities.

Diaspore, Chester, Mass. Occurs in small transparent crystals of beautiful violet and amethystine tints, the terminal planes being especially lustrous. They are tabular in habit and occur grouped on Emery. Few have been found recently, and the mine dumps have been thoroughly searched. Our stock includes some fine groups, \$1.00 to \$9.00.

Fayalite, Rockport, Mass. A rare ferrous orthosilicate, belonging to the Chrysolite group. Only recently described from this locality by Penfield. We secured nine-tenths of the small find. Pure dark brown masses of typical resinous lustre, \$1.00 to \$6.00.

Chondrodite, Tilly Foster Mine, Brewsters, N. Y. The splendid crystallizations formerly found are no longer obtainable. We still have a few groups of bright ruby-like crystals, \$.50 to \$2.00.

Franklin Furnace, New Jersey, has furnished not only a greater variety of minerals than any other region of like size, but its long list of species peculiar to the locality is most exceptional. Frequent trips made by our collectors afforded material which has been described at length in the *Am. Jour. Science*. During the longest visit, four new species, previously announced, were found, besides seven then undescribed minerals, three of which were later described as new species by Prof. S. L. Penfield and Mr. C. H. Warren. Some of the new lead compounds as well as many of the older species, are similar to certain Swedish minerals. We offer the following characteristic specimens:

Nasomite (*A. J. Sc.*, Vol. VIII., p. 346). $\text{Pb}_6\text{Ca}_4\text{Cl}_2(\text{Si}_2\text{O}_7)_3$. A new species which although massive, is a peculiarly interesting lead silicate. Its greasy lustre is a distinctive characteristic. To the small stock originally secured, nothing was added in spite of careful search. Specimens showing several associated minerals, \$1.00 to \$4.00.

Leucophoenicite (*A. J. Sc.*, Vol. VIII., p. 351). A manganese Humite associated with green Willemite, Zincite, Franklinite and Hardystonite. Characteristic specimens of this new species illustrating the name ("pale purple-red") are sold at very reasonable rates, \$.50 to \$3.00.

Hardystonite (Prof. J. E. Wolff in *Proc. Am. Acad. Sci.*, 34, 479 '99), $2\text{CaO} \cdot \text{ZnO} \cdot 2\text{SiO}_2$. The interesting variations of this new species require several specimens for its proper representation, and as it is the cheapest new mineral on sale, a series is not expensive. Pieces neatly trimmed to 5 x 7 cm. size, showing the association of Garnet, Willemite, Zincite, Franklinite, etc., \$.20 each. Larger at proportionate rates up to \$2.00. (A few crystallized pieces at higher rates.)

Hancockite (*A. J. Sc.*, Vol. VIII., p. 339). Occurring in druses of beautiful red monoclinic prisms with Axinite, Garnet, Franklinite, etc., \$.20 to \$3.00.

Roebbingite (A. J. Sc., Vol. III., p. 413). A new and interesting hydrous calcium silicate, containing sulphur dioxide and lead. Found in solid white masses of minute prismatic crystals somewhat resembling massive Datolite. Rare, \$1.00 to \$4.00.

Polyadelphite. Pretty groups of yellowish-brown dodecahedrons in white calcite, \$.30 to \$2.00.

Chalcophanite, crystallized (drusy), \$.20 to \$1.00.

Jeffersonite. Groups of large dull crystals. Found many years ago, \$.75 to \$5.00.

Yellow Axinite. Minute brilliant crystals in cavities, also massive, \$.25 to \$1.50.

Rhodonite var. Fowlerite. Beautiful groups of triclinic crystals, including a number of fine large museum specimens, \$.50 to \$10.00.

Zincite. Masses of the true blood-red color with pretty associations; also a micaceous variety. \$.30 to \$1.50. A few crystallized specimens at higher prices.

Fluorescent Willemite. Massive specimens of various shades, the apple-green quality being especially selected for its beautiful green fluorescence under the radium and ultra-violet rays. It is the most striking of the few minerals which have been found to exhibit the phenomenon to a marked degree. \$.25 to \$2.00.

Troostite, in symmetrical crystals. Now rare. \$.50 to \$3.00.

Franklinite. A good stock comprising specimens found some years ago. Large octahedrons, often modified by the dodecahedron. In Calcite. \$.75 to \$3.00.

Brown Tourmaline, Hamburg (near Franklin). Well developed crystals of varied habit. Light and dark shades. Their bright planes contrast well with the white Calcite. \$.50 to \$2.00.

Domeykite var. Stibiodomeykite, Mohawk Mine, Keweenaw Co., Michigan. New and interesting variety of a rare arsenide. Described by Prof. G. A. Koenig. Clean metallic masses with bits of the white limestone matrix attached. \$.75 to \$4.00.

Fluorescent Selenite, Mahoning Co., Ohio. The wonderful greenish luminescence excited by the new rays in these transparent crystals, has greatly increased the popularity, which their crystallographic perfection had already won for them. Various types 3 to 4 cm., \$1.00 per dozen. Larger, \$.15 to \$.20 each. Second quality at lower prices.

Jamesonite, Silver City, S. D. A lead sulphantimonite formerly obtainable with difficulty. A visit to the locality secured a good supply of highly characteristic material. It possesses a bright metallic lustre and a feathery-granular structure. Exhibits the usual oxidation to Bindheimite. \$.30 to \$4.00.

Selenite (Plate XVI.), near Hermosa, S. D. This new locality is remarkable for its duplication of the "Model Selenites" of Ohio. While

often equalling the latter in symmetry and perfection of form, the new crystals are many times larger than the old. The largest crystals are slightly rougher. 5 to 12 cm. length. \$.20 to \$1.00.

Calcite Containing Sand (Plate XVII.). Devils Hill, S. D. Popularly known as "Sand Crystals" because of the 64 per cent. of quartz grains and pebbles enclosed. Analogous to the Fontainebleau crystals but of totally different type. Our collector made a ten-day trip to the locality, far from the railroads in the Pine Ridge Indian Reservation. These remarkable crystals have been investigated crystallographically by Prof. S. L. Penfield (Am. Jour. Sc.) and their mode of occurrence described by Prof. E. H. Barbour (Bull. Geol. Soc. Am.). The locality was well worked and only the best portion of the crystallizations handled were saved. By far the largest lot ever brought from the locality was shipped. It embraces the loose doubly-terminated steep hexagonal pyramids as well as hundreds of clusters and concretions of the same. 5 to 25 cm. \$.20 to \$.80.

Melanterite, near Hayward, S. D. Solid fibrous masses of bluish green color. \$.30 to \$1.25.

Muscovite, near Keystone, S. D. Four-sided cleavages, popularly known as "Diamond Mica." The pinacoids are almost absent, the prismatic faces being highly developed. 8 to 15 cm. \$.30 to \$2.00.

Spodumene. Perfect cleavages of exceptionally sharp outline and neat form. \$.15 to \$2.00.

Columbite. Good crystals, detached and in white matrix. \$1.00 to \$6.00.

Rose Quartz, Custer, S. D. Fine deep colored pieces of best quality. \$.15 to \$.75.

Very large masses for museum display, also polished balls and slabs. \$1.00 to \$12.00.

The Joplin District is universally known as one of the richest specimen fields in the world. Frequent visits afford us a large stock of the following:

Calcite. Superb scalenohedrons of transparent quality and various shades of amber and amethyst. Twinned crystals of various types. Price varies with size. \$.15 to \$6.00.

"Giant Phantoms." Scalenohedral crystals enclosing small spear-shaped Marcasite crystals, regularly arranged in bands, giving a shadow or phantom effect in the interior. 25 to 50 cm. diameter. \$7.00 to \$10.00.

Iceland Spar. Pale amber and amethystine rhombs. Also showy twinned cleavages. \$.30 to \$2.00.

Galena. Octahedrons, cubes and cubo-octahedrons. Some on pearl spar; others on blende coated with bitumen. \$.40 to \$1.50.

Sphalerite. Many choice examples—either the darker "black jack" or the rich "ruby blende" in most attractive groups. \$.20 to \$3.00.



PLATE XVII.

CALCITE CONTAINING SAND. DEVIL'S HILL, PINE
RIDGE INDIAN RESERVE. SOUTH DAKOTA.

REDUCED $\frac{1}{3}$.

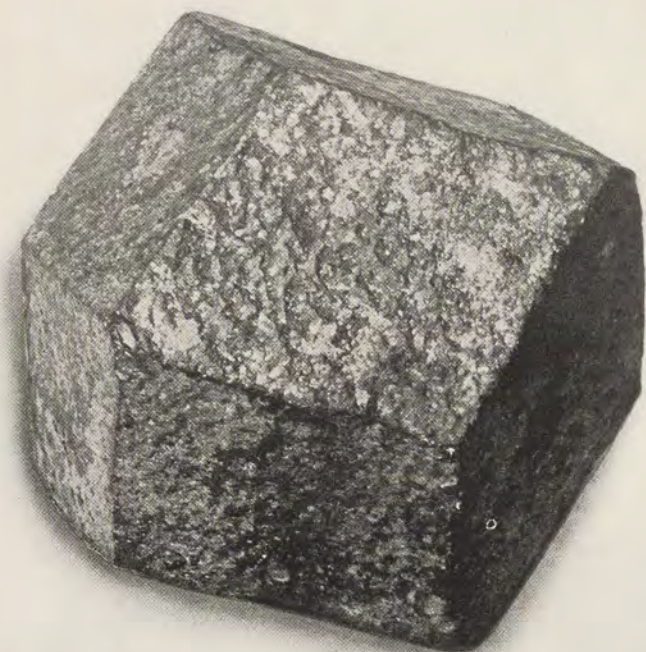


PLATE XVI.

ALMANDITE GARNET. SALIDA, COLORADO.

SELENITE. HERMOSA, SOUTH DAKOTA.

Chalcopyrite on Pearl Spar. A pretty representation of both species. The sharp model-like sphenoids are scattered over the pearly Dolomite crystallization. \$.20 to \$1.50.

Calamine, Granby, Mo. Familiar drusy crystallizations, but quite superior in the size and development of the individuals. They are symmetrical prisms of 2 to 3 mm. length, distinct in outline, brilliant and transparent. \$.25 to \$1.00.

Greenockite. As a bright yellowish green coating on Blende and Marcasite. \$.75 to \$4.00.

Since the first collecting trips made to Hot Springs and Magnet Cove, Arkansas, and the large sales of Quartz, Brookite and Rutile which followed, our stock has been frequently replenished by the specimens secured in later visits and in work done expressly for us at the localities.

Quartz var. Rock Crystal. The largest stock of these splendid crystallizations in the world. Showy clusters 7 to 40 cm. across. \$.20 to \$25.00.

Detached crystals. \$.10 to \$1.00.

Flattened and other abnormal forms. \$.20 to \$3.00.

Monticellite. Distinct crystals of about 1 to 2 cm. diameter in Calcite matrix. \$.30 to \$4.00.

Dysanallyte. Bright cubes, cubo-octahedrons and octahedrons in matrix. \$.50 to \$2.00.

The same, loose, 10c. to \$1.00 per dozen.

Wavellite. Handsome specimens, showing green radiations on a flat matrix. Some exhibit hemispheres with surfaces composed of terminations of the crystals. \$.20 to \$3.00.

Rutile, Nigrine, Magnet Cove. Geniculated forms of twinning, sixlings and eightlings.

Brookite in single detached crystals of symmetrical orthorhombic form and brilliant planes. \$.10 to \$1.50.

Rutile Paramorph after Brookite. Excellent representatives of this curious alteration. \$.20 to \$1.50.

Magnetite var. Lodestone. Masses possessing strong polarity, picking up tacks, nails and chisels. \$.25 to \$4.00.

Tourmalinitic Quartz, near Silver Star, Montana. Plate XVIII. We secured direct from the locality over 1200 crystals of this interesting gem stone. A rough stem or "core" densely coated and filled with Tourmaline needles, sometimes forms the end of the crystal carrying the most Tourmaline. The presence of an excess of Tourmaline interrupts the Quartz crystallization, the inclusions lessening in number as the opposite and perfect end of the crystal is approached. The Quartz is of the smoky variety, the Tourmaline giving it a greenish tinge. Excellent examples, some doubly terminated, from 4 to 12 cm. long. \$.15 to \$.75.

Cabinet specimens 5 to 20 cm. \$1.00 to \$3.00.

Museum crystals up to 45 cm. at higher prices.

Polished cross-sections are of exceptional beauty and interest, showing the delicate needles branching in every direction. They often exhibit shadowy hexagonal banding, marking the crystal growth. The two rhombohedrons of which the termination is composed are sometimes shown by differences in depth of color (note alternate triangles illustrated). 3 to 10 cm. diameter. \$.50 to \$4.00.

Amethyst Cappings. In the same find were a few choice Amethyst crystallizations arranged in paralleled groups, often capping the Smoky Quartz in a unique manner. \$1.00 to \$6.00 for the larger. Excellent Amethyst crystals, \$.30 to \$1.50.

Opal-Wood (Plate XIX.), Clover Creek, Lincoln Co., Idaho. Considerable work done at this locality secured us all the solid branches suitable for specimens. It appears to have been a finely-marked oak or similar species, the small cells, tissues, rings, radial lines, knots, bark and other marks of growth being shown with a marvellous perfection and minuteness of detail. All this is reproduced in a lustrous brown-yellow semi-opal, the various shades being occasionally contrasted with a rich dark brown opal at the centre. The section illustrated is an average specimen. Large show specimens, polished cross sections of the limb, showing bark, complete, 12 to 20 cm. diameter. \$6.00 to \$15.00.

5 to 10 cm. diameter. \$2.00 to \$4.00.

Selected pieces with high natural polish, showing structure, but not complete sections, 7 to 15 cm. diameter. \$.20 to \$1.00.

Giant Selenites, Wayne Co., Utah. A good stock of these well-known crystals still on hand. Sizes vary from 30 to 90 cm. in length, the monoclinic form being well shown. Their great size and transparency make them desirable for museum display, or to crown the top of a private cabinet. \$3.00 to \$12.00.

Cleavages, perfectly transparent, \$.10 to \$.75.

Cleavages containing moving bubbles, \$1.00 to \$4.00.

Microcline var. Amazon-stone, Pikes Peak, Colo. This superb Feldspar became widely distributed through our sale of it at the Philadelphia Exposition in 1876. The large and strikingly definite form and splendid green color, places it among the showiest of all crystallizations. We did much extensive and costly work at the locality in the 'seventies, and with later accessions, have had several tons of selected material. A varied assortment of groups and detached crystals of first quality and all sizes at \$.25 to \$7.00.

Tourmaline, near Canon City. A new find of brilliant long black prisms in white Quartz. Curved and interrupted crystals frequent. The most striking and handsome Tourmalinitic white Quartz on record. \$.40 to \$2.00.



PLATE XVIII.
SMOKY QUARTZ CONTAINING TOURMALINE.
SILVER STAR, MONTANA.



PLATE XIX.
OPALIZED WOOD. CLOVER CREEK, IDAHO.

Garnet, Salida, Colo. Plate XVI. These dodecahedral Almandites are invaluable for crystallographic illustration on account of their large size and remarkable symmetry and perfection. We secured several thousand by working the mine, and offer complete crystals 4 to 10 cm. diameter at \$.75 to \$3.00 each. Broken crystals indicating the form. \$.20 to \$1.00.

Aragonite, altered, Fort Collins, Colo. Well defined hexagonal tables 2 to 5 cm. Some showing the lines of orthorhombic twinning similar to the well-known type from Bastennes, only more tabular. Also penetrating groups. \$.20 to \$1.00.

Carnotite, Montrose Co., Colo. Selected examples of this yellow uranium mineral in exceptionally pure specimens. \$.75 to \$4.00.

Endlichite, Hillsboro, New Mexico. All the finest specimens found were preserved and shipped to us for over a year. The mineral possesses an adamantine lustre, clear transparent quality, exquisite regularity and definiteness of outline, and color shading through yellow, red and brown. It offers a striking example of the gradations between species, both in its chemical and physical characters, as its variations display all the peculiarities of color and form of both *Mimetite* and *Vanadinite*, with many intermediate stages. In composition it is between the two, being a combination of the arsenate with the vanadate and chloride of lead.

A large stock of matrix specimens of various shades of red and yellow. The different types illustrated are selling at greatly reduced prices. For the choicest groups of brilliant, perfect crystals, \$.30 to \$2.00.

Single crystals \$.10 to \$.50 per dozen.

Melanotekite, Hillsboro. Described from this first American locality, from material furnished by us. (*A. J. Sc.*, V. VI., p. 116). It is a rare lead-iron silicate, heretofore found only in Sweden. Masses showing drusy surfaces of orthorhombic crystals. \$.40 to \$2.00.

Meteoritic Iron, Sacramento Mts., N. M. See Meteorites.

Aurichalcite, Magdalena, N. M. In tufts and velvet-like surfaces lining cavities. The acicular crystals are distinctly visible. Of a beautiful and delicate bluish green color, affording rich and showy specimens. \$.20 to \$2.00.

Allophane, *cupriferous*. One of the handsomest bits of color to be found. Its sky-blue shades much resemble some Turquoise. In bright masses of good size, occasionally with a botryoidal surface. \$.25 to \$1.25.

"Papierspath." These mines have yielded the best quality of this paper-like variety of Calcite. Hexagonal plates 1 to 2 cm. across, are grouped in pretty flower-like clusters. The glistening surfaces and translucent quality lend the specimens an icy aspect. They are of neat

size and quite durable, considering their exquisitely delicate appearance. \$.50 to \$2.00.

Yellow Wulfenite, Organ Mts., N. M. A variety of forms in this beautiful crystallization. Groups of thin quadrangular plates, yellow or brown, often transparent. Also in long tetragonal prisms with basal plane; again of cubic symmetry. \$.30 to \$5.00.

Red Wulfenite, Red Cloud Mine, Ariz. One of the most beautiful crystallizations in nature. We were the first to collect this gorgeous variety in any quantity, and by several visits to the mine obtained the best specimens known. Crystals 1 to 2 cm. \$.10 to \$1.50.

Groups of Crystals, \$.50 to \$12.00.

Jasperized Wood, Chalcedony Park or Great Petrified Forest, Ariz. This splendid petrification with its shades of red and violet charmingly blended, is well known. A personal collecting trip brought us choice examples of trunks up to 40 cm. diameter. Polished sections showing the bark, 3 to 20 cm. diameter. \$1.00 to \$12.00.

Selected pieces unpolished. \$.15 to \$5.00.

Fluorite, Castle Dome Dist., Ariz. Octahedral cleavages of pink and emerald green shades. \$.10 to \$.75.

Lawsonite, Tiburon Peninsula, Calif. A new species in well-defined orthorhombic crystals, up to 2 cm. in length, of varying habit. A basic metasilicate of calcium and aluminium. We purchased most of the best specimens found, working over a quantity of the Margarite schist to develop a few fine crystallizations. \$1.50 to \$10.00.

Less perfect but typical matrix specimens and detached crystals. \$.20 to \$1.00.

Hanksite, Borax Lake. A lot which was the result of several years' saving, includes three different types of perfect and complete crystals. They are translucent and as regular as models. \$.25 to \$2.00.

Thenardite. Fine orthorhombic crystals 5 to 8 cm. long. The unit prism *m* and macrodome *t* predominate. Single and grouped. Their large size makes them useful for crystallographic demonstration. Large groups of the same. \$.50 to \$3.00.

Small cruciform twins and simple crystals, 3 cm. long. \$.10 to \$.20.

Halite or Rock Salt. Curiously distorted and abnormal forms of the cubo-octahedron. The beauty and oddity of these transparent, sharp-angled crystals, found for them a large sale. 3 to 5 cm. long. \$.10 to \$.25.

Northupite. W. M. Foote, A. J. Sc., V. L., p. 480; J. H. Pratt, A. J. Sc., V. II., p. 123. The comparatively small find of this new species was purchased by us entire. Occurs in small octahedrons with triangular markings. Regularly arranged dark lines in the interior are due to inclusion of carbonaceous matter. \$.20 to \$1.50.

Colemanite (Plate XX.), San Bernardino Co., Calif. We have the only good stock of this mineral in the world. In the lower part of the plate are shown a group and a detached crystal, the latter in one of many habits assumed. Its adamantine lustre prevented good photographic reproduction. It is a perfectly stable and solid compound and a most beautiful example of the class of borates. \$.50 to \$7.00.

Tourmaline var. Rubellite (Plate XXI.), Pala, San Diego Co., Calif. We were the first to offer for sale this deservedly popular mineral. The delicate pink crystals radiate through a lilac Lepidolite rock, presenting a most charming combination of colors. As a showy cabinet specimen, or for ornaments, paper-weights, etc., it has few rivals in cheapness or beauty. Museum specimens 15 to 40 cm. across, with large radiations of crystals. \$1.50 to \$8.00.

Choice smaller pieces, \$.20 to \$1.00.

Several months of work by experts in exposing the crystals of the finer pieces, has developed some unique and strikingly beautiful crystallizations for museums. The careful chiseling leaves the terminated crystals standing in bold relief on the Lepidolite base, as figured. \$2.50 to \$25.00.

Opal var. Common Green-opal, Waterville, Wash. The handsomest and cheapest semi-opal known. A mottling of red through the translucent olive green adds much to its beauty. Polished sections showing the blending colors. \$.75 to \$4.00.

Rough pieces, \$.25 to \$2.00.

Canada.

Molybdenite Crystals (Plate XXII.), Aldfield, Pontiac Co., Quebec. We did considerable quarrying solely to secure these crystals, dynamite being steadily employed to remove the mass of rock overhanging the vein. Many crystals were destroyed, but a number were saved, which will rank always as superb specimens. The work was abandoned when the last two weeks of labor resulted in uncovering but one crystal of any value.

The crystals measure from 1 to 5 cm. diameter. They occur in short hexagonal prisms, often brighter and better defined than the large crystals figured. While the very finest have been acquired by the great museums, a few remain which are unsurpassed by anything for sale elsewhere.

Prices are about one-half former rates. Cabinet specimens, cleavages, and crystals in matrix. \$.20 to \$4.00.

A few choice large museum pieces. \$5.00 to \$10.00.

Zircon, near Eganville, Renfrew Co., Ontario. The twin crystals were first brought to the attention of mineralogists in 1881 by Dr. Foote.

Choice matrix specimens. \$.50 to \$4.00.

Apatite. Doubly terminated sharp-edged hexagonal prisms, 5 to 10 cm. \$.20 to \$3.00.

Titanite, Sphene. In the symmetrical, dark brown crystals so well known from this locality, 2 to 4 cm. \$.30 to \$2.00.

Perthite, "Sunstone," Perth, Ontario. A curious mixture of feldspars, having a pretty aventurine effect. 5 to 12 cm. \$.20 to \$1.50.

Labradorite, Pauls Island, Labrador. A familiar and beautiful ornamental stone. Fine polished pieces reflecting shades of red, green, blue and violet. \$.50 to \$2.00.

Sperrylite, Sudbury, Ont. Platinum arsenide in microscopic crystals. \$1.00 to \$4.00.

Sodalite, Hastings Co., Ont. A beautiful Prussian blue, streaked occasionally with light azure. They are the cheapest and best examples of the mineral yet found, and should be in every collection. Shapely cabinet pieces, showing fresh fracture, 4 to 12 cm. \$.20 to \$1.50.

Polished. \$.50 to \$4.00.

Pyroxene, var. *Augite*, Hastings Co., Ont. Large green crystals in Calcite. \$.30 to \$1.00.

Native Arsenic, Queen Charlotte Islands, Brit. Col. A recently opened and promising vein on Alden Island, affords masses of the pure mineral quite equal to the Saxon product. Typical mammillary masses prettily contrasted on white Calcite.

Mexico.

Boléite, Boleo. A stay of several weeks in this locality, together with later purchases, has given us a wonderful series of this beautiful and rare new mineral. Occurs in cubes and cubo-octahedrons, sometimes a centimeter or more in diameter; composition: $\text{PbCl}_2 + \text{CuOH}_2\text{O} + \frac{1}{3}\text{AgCl}$. The mineral exhibits some interesting figures when cleaved parallel to the face of the cube. It is pronounced pseudocubic, belonging to the tetragonal system.

Perfect loose crystals, 3 to 12 mm. diameter, bright, sharp, and of beautiful indigo-blue color. \$.20 to \$3.00.

Cumengite. Occurs ordinarily in bright octahedral crystals but a few millimeters in diameter, in a gangue of white clay. Usually modified. Composition: PbCl_2 . CuOH_2O , differing from Boléite by the absence of $\frac{1}{3}\text{AgCl}$.

Beautiful "trillings," acute or truncated, 2 to 8 mm. diameter. \$.50 to \$4.00.

Calcite, Guanajuato. Personal trips to the far famed "Andreasberg of America," and several recent shipments afford us a rich stock of the numerous habits of Calcite which occur here in infinite variety. A dozen or more types, including several twinned forms, are represented. One of these is here shown. Beautiful and perfect crystallizations, occasionally implanted on Amethyst. \$.25 to \$4.00.



PLATE XX.

SULPHUR. CIANCIANA, SICILY.

COLEMANITE. SAN BERNARDINO CO., CALIFORNIA.



PLATE XXI.
TOURMALINE VAR. RUBEILLITE.
PALA, CALIFORNIA.

Pseudo-octahedral Fluor, built up of minute cubes and dodecahedrons. The etched faces are surmounted by brilliant modifications. Also simple octahedrons and dodecahedrons. Groups. \$.50 to \$2.00.

Quartz Crystals containing moving bubbles. Excellent little specimens at one-third former prices. \$.20 to \$.75.

Amethyst in groups of unrivaled richness and depth of color. Also specimens showing more delicate shades. \$.30 to \$2.00.

Stilbite. Delicate cream colored groups of unusual beauty. Crystals symmetrical and well defined. \$.20 to \$1.50.

Rose Apophyllite in handsome groups of pyramidal crystals. Beautiful white and colorless crystallizations. \$.40 to \$6.00.

Fluorescent Hyalite. Clear botryoidal masses of glassy lustre, exhibit the most beautiful green luminescence before the ultra-violet rays. \$.40 to \$3.00.

Guanajuatite. Bismuth selenide. Typical pieces. \$1.00 to \$4.00.

Cuprodescloizite. A Descloizite containing 8 per cent. of copper. Occurring in drusy botryoidal masses; 4 to 10 cm. \$.25 to \$1.50.

Fire Opal, Queretero. In trachyte matrix. \$.20 to \$1.50.

Mexican Onyx, Tecali. Beautiful polished examples of this well known variegated marble. \$.30 to \$1.50.

Norway and Sweden.

The more important localities were visited. At Arendal a small steamer was hired, and many points reached, which are inaccessible by the ordinary modes of travel. These special efforts furnished more than one great European collection with species formerly unrepresented.

The species collected and purchased numbered over one hundred, of which we mention but a few examples.

Thalenite, Osterby, Sweden, Geol. For. Forh. XX., 308. A new and very rare mineral, containing the largest percentage of yttrium in any natural compound. \$1.50 to \$6.00.

Meliphanite, Langesund. Typical yellow masses. \$.75 to \$3.00.

Orangite. Translucent pieces. \$1.00 to \$4.00.

Eudidymite. Heretofore rare. Excellent crystals of typical monoclinic form. \$.40 to \$1.50.

Native Lead, Langban. Very rare. Flattened masses of the pure metal, on matrix. \$.50 to \$3.00.

Broggerite. Variety of Uraninite. Cubo-octahedrons. \$1.00 to \$8.00.

Monazite. Good monoclinic crystals. \$.25 to \$1.00.

Aeschynite, Arendal. Bright masses. \$1.00 to \$4.00.

Thorite. Detached prismatic crystals. \$.50 to \$6.00.

Rhodonite var. Paisbergite, Paisberg. One of the few showy Scandinavian minerals. The crystals are of exquisite pink color, bright and of well-defined triclinic form, though of different habit from the better known Fowlerite. Grouped in cavities of hard rock. 4 to 10 cm. \$.30 to \$5.00.

Brandtite. Small crystals on matrix. \$.75 to \$3.00.

Vesuvianite, Eker. Bright groups of sharp crystals. \$.50 to \$2.00.

Chondrodite, Nordmark. Large grayish green crystals. \$.75 to \$3.00.

Garnet, Bodo. Remarkably perfect and sharp dodecahedrons and trapezohedrons, loose. \$.15 to \$.25.

Xenotime, Tvedestrand. Massive and crystallized. \$.50 to \$4.00.

Oligoclase var. Sunstone. Highest gem quality. Rough and polished. \$.75 to \$4.00.

Samaraskile, Satersdalen. Typical masses. \$1.00 to \$2.00.

Gadolinite. Crystals and masses. \$1.00 to \$15.00.

England.

Probably no mining region in the world has yielded a greater abundance and variety of strikingly handsome crystallizations, than the northern counties of England. Repeated personal visits and long established connections at the mines have greatly enriched our stock. Several large recent consignments afforded the following, among which should be noted the entirely new types, as the mere species names are misleading:

Quartz-coated-Fluors (Plate XXIII.), Weardale, Durham. Flashing groups of blue and purple cubes, daintily sprinkled with natural gems of the "Herkimer County" quality. This new combination is assuredly one of the handsomest and most attractive known to mineralogists. *One of our best large groups was sold to an English museum, possessing an unrivalled series of Fluorites.* Later, we received equally fine ones. Can more be said as to the quality of this new and limited find? The older and vastly inferior type coated with Milky Quartz is also plentifully represented in our stock. \$.50 to \$20.00.

Fluorite. All the ordinary and some extraordinary kinds. A large stock of the familiar colors; blue, purple, green and yellow in countless shades. One of the ever popular minerals on account of its rich hues and the lustrous quality of the transparent crystals. We have all grades from the huge cubes at about \$.40 per kilogram, up to the superb transparent crystals of adamantine lustre, with faces showing vicinal planes, and interior lined in vari-colored parallel bands. Also the rare complete cubes in symmetrical, elongated and flattened habits. Prices much reduced. \$.20 to \$12.00.



PLATE XXII.

MOLYBDENITE. ALDFIELD, QUEBEC, CANADA.



PLATE XXIII.
FLUORITE COATED WITH QUARTZ.
WEARDALE, DURHAM.

Barites, Frizington, Cumberland. An excellent assortment of the various forms and colors. Splendid golden yellow and brown prisms. Blue tabular crystals in delicate groups, etc., etc. \$.30 to \$5.00.

Calcite. In showy groups of several types. \$.50 to \$3.00.

Smoky Quartz on Hematite. Brilliant and perfect dodecahedral Quartz crystals, on sparkling surface of velvet-black Hematite. \$.30 to \$2.00.

Aragonite. Luminesces beautifully under the ultra-violet rays. Groups of "Cathedral Spires." \$.30 to \$1.00.

Barytocalcite. Distinct crystals in groups, 4 to 8 cm. \$.40 to \$1.50.

Witherite, Alston Moor, Cumberland. Six-sided pyramidal crystals (orthorhombic twins) on matrix. \$1.00 to \$6.00.

Sphalerite, Nenthead, Cumberland. Brilliant and sharply defined crystals, scattered attractively over white druses of pseudomorphous Quartz. An odd and very pretty novelty. \$.75 to \$8.00.

Matlockite, Matlock. Secured through the purchase of an old local collection. Now very rare. Tabular crystals. \$1.00 to \$15.00.

Stannite, Cornwall. Masses with Chalcopyrite. \$.30 to \$1.25.

Wolframite. Bright cleavage pieces. \$.50 to \$2.00.

Siderite. In groups of excellent crystals in various habits. \$.30 to \$2.00.

Switzerland.

Terminated Cyanite (Disthene), Plate XXIV. Pizzo Forno, near Campolungo, St. Gothard Region. Sapphire blue of the true shade is to be found in this popularly named "False Sapphire." A trip by our collector and considerable work done for us, yielded some superb specimens. The locality has been known for over half a century, but like many others situated on the snow clad peaks of Switzerland, is quite unworkable save during a few weeks of the year, and rarely visited even then. Thus the specimens are not new—just vastly superior to those in the large museums, all of which have the early specimens, consisting of a rough network or mesh of crystals penetrating the Paragonite gangue. These specimens, however, are fast being replaced or supplemented by selections from our latest find.

Recognizing that painstaking and delicate hand-work on the development of the better specimens, would be appreciated, many months of expert labor were devoted to the removal of the Paragonite matrix. The transparent blue Cyanite blades were thus exposed, associated with lustrous dark brown Staurolites, often parallel and penetrating. This association is mentioned in some of the mineralogies, which likewise refer to the Cyanite as "rarely terminated." Yet we have Cyanites 10 or 12 cm. long, perfectly terminated by the simple pyramid *q* and

penetrating the length of a Staurolite crystal. This peculiarity, together with the contrasting blues and browns standing out in strong relief on the glistening and pearly background, affords one of the most striking combinations to be seen in any collection. Both minerals occur in well defined symmetrical crystals of a quality superior to that of any other locality. The Cyanite usually exhibits strongly marked polysynthetic twinning. The stock of really fine specimens is limited and rapidly diminishing. \$2.00 to \$15.00.

Small matrix pieces. \$.30 to \$1.50.

Detached crystals, \$.30 per dozen to \$1.00 each.

Terminated crystals. \$.50 to \$3.00.

Staurolite, Pizzo Forno. We have but an occasional specimen in which this species predominates, the principal mineral generally being the Cyanite. A few of very choice quality. \$1.00 to \$6.00.

Detached crystals, parallel or penetrated by Cyanite, as illustrated in Plate XXVI. \$.50 to \$1.50.

Broken crystals. \$.50 per doz.

Hematite, "Eisenrose," St. Gothard. In the well-known twinning aggregates. \$.50 to \$20.00.

Octahedral Rose Fluor. A beautiful and highly prized variety, which like the "Eisenrose," is held at fancy prices near the locality. \$2.00 to \$25.00.

Axinile. A few bright groups of these brilliant triclinic crystals. \$.75 to \$6.00.

Anatase. Small crystals on matrix. \$.50 to \$2.50.

Quartz. Smoky crystals, with the *s* plane prominent. \$.30 to \$2.00.

Italy.

Several extended trips were made between 1890 and 1901 to Sicily, Elba, Sardinia, and important localities on the peninsula. More than ninety boxes of minerals were thus obtained, which with consignments received later, comprise, unquestionably, the finest and largest stock of Italian minerals existing in Europe or America. The material was *acquired at the mines*, and in some instances during the period when the finest crystallizations were most abundant. Hence, gorgeous Sulphurs and other formerly expensive minerals are now being sold at incredibly low prices; in some instances at less than they could be bought at retail in Italy. Visits to the leading mineral collections, secured historical rarities through personally selected exchanges, which are quite unobtainable otherwise, the localities being long since exhausted or annihilated, as in the case of certain Vesuvian species. (The rarest of these are not noted here, because of the meagre supply. In some instances the last duplicates came to us.)



PLATE XXIV.
CYANITE. ST. GOTHARD REGION, SWITZERLAND.
REDUCED $\frac{1}{3}$.

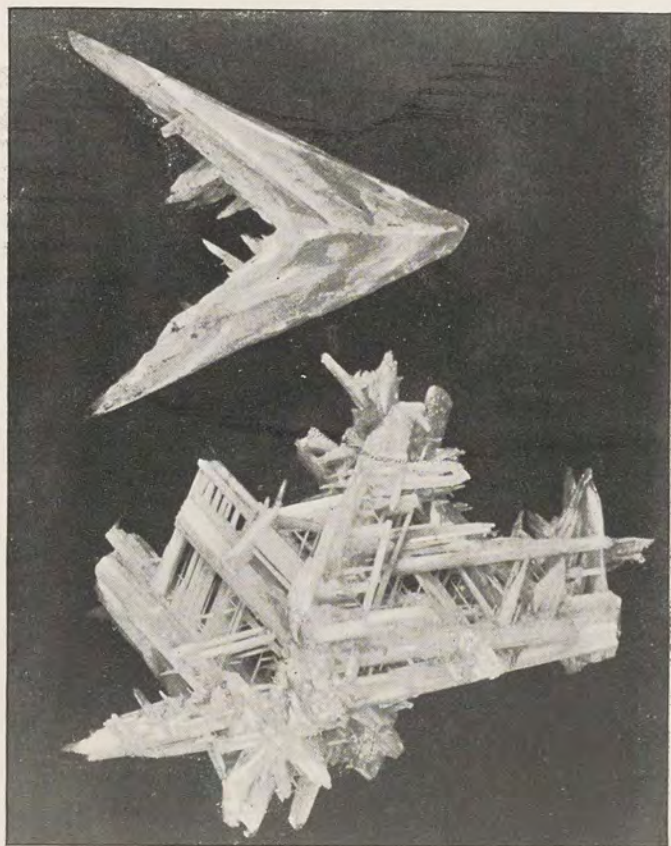


PLATE XXV.
CERUSSITE. BROKEN HILL, NEW SOUTH WALES.

Sulphur (Plate XX.), Cianciana, Sicily. It is impossible to describe the superb beauty of this mineral to those unfamiliar with it, and our illustration gives but a poor idea of its appearance. Flashing groups of perfect, yellow crystals, 5 to 30 cm. \$.20 to \$25.00.

Sharp detached crystals, transparent, 2 to 5 cm. \$.20 to \$1.50.

Selenite. Perfectly transparent "fish-tail" twins. Very showy as case specimens. \$.20 to \$3.00.

Selenite inclosing Sulphur or Aragonite. One of the most interesting examples of the phenomenon of inclusion. \$.75 to \$3.00.

Melanophlogite. A pseudomorphous form of silica, occurring in translucent cubes on Sulphur. \$.30 to \$2.00.

Aragonite. Splendid groups of six-sided prisms (orthorhombic twins, showing the striae plainly). The crystals are pale blue or yellowish, very brilliant and often measuring 3 cm. across. \$.50 to \$8.00.

Calcite pseudomorph after Aragonite. These curious six-sided hollow forms show the partial replacement of the original prism, the twinning striae being indicated by radiating fissures. Odd and exceedingly attractive. Choice specimens 7 to 25 cm. \$.50 to \$5.00.

Celestite. Showy groups of milky to colorless prismatic crystals of sharply defined and symmetrical habit. \$.50 to \$6.00.

Hematite, Elba. These wonderful crystallizations have been long and widely known. The pyramid *n*, rhombohedron *r*, and curved rhombohedron *u* predominate. Crystals in varied form, measuring 1 to 4 cm., are coal-black, brilliant and sharply defined. Groups 5 to 10 cm. \$.30 to \$1.50.

Detached crystals. \$.10 to \$.50.

Pyrite. The commonest form is the pyritohedron, frequently modified by the octahedron. Simple crystals and penetration twins, 2 to 4 cm. \$.10 to \$1.00.

Tourmaline. We secured a large lot of crystals of good quality at a low figure and offer them at exceptional prices. Broken prisms in various colors. \$.10 to \$.20.

Terminated crystals. \$.25 to \$10.00.

Phosgenite, Monte Ponì, Sardinia. Brilliant well-formed crystals, some over 2 cm., on matrix. \$.75 to \$5.00.

Anglesite. Our specimens bear out the assertion that this locality produces the finest Anglesites in the world. Clear-cut, sharp crystals, colorless to gray-black; all of a dazzling adamantine lustre.

Neat matrix specimens. \$.50 to \$3.00.

Cerussite. In delicate "wheat-sheaf" twins. \$.30 to \$2.00.

Piedmontite, St. Marcel, Piedmont. Typical masses of the pure mineral and crystallized in Quartz matrix. \$.30 to \$1.50.

Violan. Characteristic specimens. \$.30 to \$1.25.

Babingtonite, Baveno. A new find affording a small number of the finest crystallizations ever seen of this rare triclinic mineral. New and abnormal crystal habits. \$1.50 to \$8.00.

Baveno Twins of Orthoclase, Baveno. Type specimens at lower prices than foreigners pay at the much visited quarries. \$.30 to \$1.00.

Bavenite. A new zeolite occurring in orthorhombic blades, grouped in white radiating spherical tufts on Orthoclase. Composition, $\text{Ca}_3 \text{Al}_2 \text{Si}_6 \text{O}_{18} \text{H}_2 \text{O}$. Extremely rare. We have but a few typical specimens. \$2.00 to \$8.00.

Cavernous Quartz, Poretta. Several thousand were secured at a cost which permits retailing excellent crystals, at \$.10 to \$.35 each.

Crystals containing moving bubbles. \$.20 to \$.200.

Fiorite, Santa Fiora. Pearly concretions of botryoidal and stalactitic form. \$.25 to \$1.00.

Meneghinite, Bottino. The mines were worked in the days of the early Romans. The species is exceedingly rare, a visit to the mine securing the only available crystals in Italy. We offer crystals 1 to 2 cm. long, \$.75 per dozen.

Quartzine. Typical masses of compact fibrous structure with satiny "cat's-eye" reflections. \$.40 to \$1.50.

Selenite and Sulphur, Bellisio Solfare. New and most interesting habits are shown in a quality of crystals which excel in their perfect limpidity and lustre, the finest products of other localities. Rare. \$1.00 to \$4.00.

Nephelite, Capo di Bove. Perfect little hexagons of matchless symmetry and lustre, implanted on lava. Desirable for the reflecting goniometer. A large stock of pieces 4 to 10 cm. \$.50 to \$2.00.

Melilite. In short tetragonal prisms of yellow color, often associated with Nephelite. \$.50 to \$3.00.

Granuline. White granular masses. \$.40 to \$1.50.

Euchlorine. Green drusy crystallizations. \$.50 to \$1.50.

Meionite. Glassy and milky tetragonal prisms in matrix. \$.50 to \$2.00.

Australia.

Our introduction in 1896 of various unique Australian minerals was but a forerunner of many later and more notable finds. As soon as the necessity for having a traveller in this new and rich field became manifest, we secured the services of a mineralogist possessing an intimate acquaintance with Australian localities. Thus were we not only the first to place a large choice of these minerals before American and European museums, but we have from season to season, for eight years, augmented our stock with the results of oft-repeated trips to the principal localities. In one instance more than a year was spent at one mine. The combined stocks of all other dealers do not approach our

series of Australian minerals, either in quality or variety. The economy of this direct gathering of specimens at the mines has permitted heavy reductions in the prices of nearly all of the following, present prices often being less than half the early figures.

Broken Hill, New South Wales. In this district lead and silver have been steadily mined for many years, and it has ranked as one of the best paying group of mines in the world. The numerous shafts sunk disclosed a veritable treasure ground for science. Unhappily the oxidized zone has been passed and good crystallizations are yearly becoming rarer.

Stolzite. PbWO_4 , Tetragonal. A comparatively new but already well-known find. The crystals, showing the two pyramids and base, are infinitely superior to the old German examples. Groups of brilliant yellowish brown crystals, 1 to 5 mm. or more. Some daintily scattered over the matrix. Rare. \$2.00 to \$15.00.

Cerussite. (Plate XXV.) Stellated and "Spear-head" twins. Never has this beautiful mineral been seen in more magnificent crystallizations than these. A fine satiny adamantine lustre is shown alike on both the delicate gray-tinted and the snow-white crystals. A variety of form is exhibited in reticulated groupings and loose twins. \$.50 to \$12.00.

Anglesite Coating Twinned Cerussite. (Plate XXVI.) A deposit of small brilliant Anglesite crystals on the Cerussite. The general outlines of the primary crystallization are beautifully shown. Selected cabinet specimens up to museum size. \$.50 to \$10.00.

Golden Anglesites. Like the foregoing, but the Cerussite base less prominent, the Anglesite crystals being better defined, and often exceeding 1 cm. They are of a brilliant golden or honey-yellow tint. A multitude of complex and interesting habits. \$.50 to \$5.00.

Azurite. Groups of definite and brilliant tabular crystals of 2 to 12 mm. size; fine color, gemmy quality. \$.30 to \$1.50.

Embolite. Symmetrical cubes with one or both tetrahedra, 1 to 2 mm., scattered over a Limonite matrix. \$.50 to \$3.00.

Iodyrite. In minute crystals on matrix, illustrating the hemimorphic hexagonal character. Rare. \$1.50 to \$8.00.

Strontianocalcite. In opaque white globules whose surfaces consist of terminations of acute rhombohedrons. The globules are 2 to 12 mm. diameter and neatly mounted on a dark stalactitic Limonite. Minute isolated rhombohedrons are often present. Also in botryoidal masses of pale pink tint. \$.50 to \$3.00.

Pyromorphite. Aggregates of rich brown hexagonal crystals of good size, at once suggesting the familiar specimens from Nassau. Smaller crystals massed in arborescent groups. \$.20 to \$3.00.

Harlequin Opals, White Cliffs, New South Wales. These newly opened opal fields were visited by our collector, and a beautiful variety of layer opal obtained. Flashes of rainbow softened by clouded effects, together with swift alterations of marvelous color, are shown in these charming specimens. They are sometimes used as rough mounts in jewelry. The color is in zones or layers and shows best when polished in the plane of color. \$.50 to \$6.00.

Crystallized Opal (pseudomorphous). This new and rare form of Opal occurs of gem quality in spherical nodules, whose surface consists of crystals of four-sided pyramids, suggesting the orthorhombic nature of the original mineral. \$8.00 to \$20.00.

Precious Opalized Wood. Cracks and fissures of white petrified wood are filled with veins of sparkling Opal, an occurrence not noticed before. \$.50 to \$2.00.

Opalized Shells. Showing gem color when polished. \$.50 to \$4.00.

Precious "Matrix" Opal, Bulla Creek District, Queensland. An exquisite play of delicate colors, or perhaps bold and striking flashes of varied lights, have won a reputation for this stone among all others. The prominent colors are green and blue, often with red and violet spread over a broad surface of brown jaspery limonite matrix which affords a sombre but excellent background. These mines have long produced the larger part of the world's supply. The best pieces range from 2 to 5 cm. diameter and are priced at \$.50 to \$10.00.

Bismutite. An alteration product of Bismuthinite. Typical examples. \$.75 to \$6.00.

Star Sapphire, Anakie, Queensland. A small lot of especially selected specimens, exhibiting a six-rayed star on the basal cleavage. They are deep blue, of hexagonal form, and somewhat water-worn. Highly polished crystals. \$1.00 to \$5.00.

Rough crystals. \$.50 to \$3.00.

Newberyite, Skipton Caves, Victoria. An insoluble, hydrous phosphate of magnesium, occurring in irregular aggregations of bright orthorhombic crystals. \$.25 to \$2.00.

Chabazite var. Phacolite, near Melbourne. Occurs in "composite twins of great variety and beauty" (Dana). Crystals varying from 5 to 12 mm. are scattered attractively over a dull black basalt. It is safe to say that no one of the beautiful Zeolite minerals is handsomer than this, the clear-cut brilliant white to colorless hexagonal twins being well displayed against the dark background. Also some rare compound penetration twinnings. \$.50 to \$4.00.

Phillipsite. Colorless and often transparent crystals on dark basalt. Three types of perfect crystals. 1. The simple twin (Dana, Fig. 1) is uncommon; 2. Cruciform twin (Fig. 2) is the usual type; 3. More rarely a composite form (Fig. 4), which is a combination of

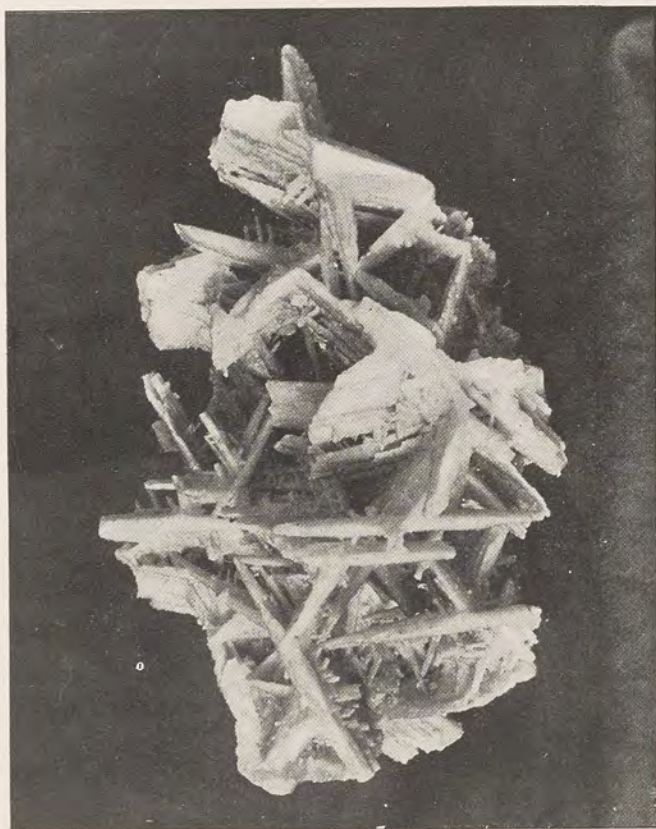


PLATE XXVI.
ANGLESITE COATING CERUSSITE.
BROKEN HILL, NEW SOUTH WALES.



PLATE XXVII.
METEORIC IRON WITH SCHREIBERSITE FIGURES,
TOMBIGBEE RIVER, ALABAMA.

three cruciform twins, suggestive of the Cumengéite trillings. They constitute the best representatives known of the species. \$.50 to \$3.00.

Aragonite. White acicular crystals attractively grouped on basalt. \$.30 to \$1.50.

Ferrocaltite. A unique variety of Calcite occurring in brown tufts of acicular crystals. Some groups are daintily sprinkled with globules and tufts of snowy Mesolite. \$.30 to \$2.00.

Gmelinite, Flinders, Victoria. Exceptionally choice examples. Crystals are six-sided twins, flesh-red color and 5 to 15 mm. diameter. Some are exceedingly sharp and brilliant. \$.75 to \$4.00.

Mesolite. Pretty specimens consisting of globules and snow-white tufts coating the trap rock. \$.40 to \$1.50.

Analcite. In brilliant limpid crystals, lining cavities of the trap. \$.40 to \$2.00.

Crocoite. (Plate XIV., p. 72.) From the long closed Adelaide Mine, Dundas, Tasmania. The wealth of crystal forms of this great find have been studied and described at some length by Palache, Van Name and others. One author says of crystals obtained of us, "With their superb color, high lustre and remarkably perfect crystallization, they are most beautiful natural objects, scarcely surpassed by crystals of any other known mineral." The discovery of new forms of this wonderful mineral is the result of over a year's work of our collector, in which the old Siberian specimens were totally outclassed. The various Tasmanian mines yielding the Chromate of Lead, have been abandoned for some years and offered no hope for specimens in the future, the water in the levels having ruined all the specimens in the porous rock. The surface indications at the Adelaide appeared to warrant operations, and a tunnel was driven into the hill above. After much expensive labor a number of fine, rich colored crystals on dark gangue were found, and a good supply of pure massive Crocoite saved. Further on, however, in a clayey deposit, our collector was fortunate enough to strike a small patch of loose prisms 3 to 9 cm. long, superbly terminated, and of a most gorgeous translucent to transparent scarlet-red. The planes are exceptionally brilliant, and the angles of ideal sharpness and perfection. The crystals show various types of terminations, from a single face (the clinodome z), to six or seven terminal planes. Only a few perfect crystals were saved as compared with the number of broken, but otherwise choice crystals. Following this great strike, several months of fruitless and expensive tunneling forced an abandonment of the work, at a depth of 232 feet, closing the most extensive mining ever done solely for scientific mineral specimens.

The consensus of enthusiastic expression everywhere heard, is that the new Crocoites are not only incomparably superior to former finds, but that they belong in the first rank of natural crystallizations. It was even remarked of these unexpected marvels of form and color, that they seemed almost artificial!

Several museums and private collectors immediately acquired series of 15 to 20 specimens, while others limited their representation to a half dozen of the more prominent types. With the rise in quality came a two-thirds drop in price. The following types are representative:

a. *Grouped Crystals* of all types and one to five centimeters long, are found on geodic and irregular masses of brown to black Limonite. Scarlet needles are exquisitely defined in bridging singly or in a network, the dark cavities of the matrix. Large heavy prisms, often duller than the needles, are not uncommon. With rare exceptions the terminated crystals on the matrix measure only a few millimeters in diameter and up to one or two centimeters in length. The acute rhombic outlines, familiar in the old Siberian crystals, are common among the Tasmanian. These latter are always terminated at one or both ends. A few pure masses of interlacing crystals show gorgeous color with occasionally a touch of the yellow Massicot. 2 cm. to 20 cm. across. \$.50 to \$15.00.

b. *Loose Terminated Crystals*. Slender scarlet-red crystals of varying terminal habits, impossible to treat justly in a photo-engraving. They are extremely brilliant and usually translucent to transparent. The unit prism is the predominant form, being quite regular and abnormally elongated. One or both domes are generally prominently developed and of mirror-like lustre (illustrated on page 72, Part I.). We still have on sale a few crystals showing the new clinodome *j*. (Van Name, A. J. S., Vol. XIII.). 2 to 5 mm. thick and 3 to 8 cm. long. \$.50 to \$10.00.

c. *Loose Broken Prisms*. These were found in comparative abundance and are sold at about one-eighth the prices of terminated crystals, which they equal in all respects save the broken ends. In addition, however, are rougher short prisms of 1 to 2 cm. thickness. \$.50 per dozen to \$1.50 each.

d. *Laboratory Material*. Pure fragments of crystals, red, at \$3.00 per kilogram.

Massicot, near Dundas. Found sparingly in amorphous masses and as a pulverulent coating on Anglesite. Dull sulphur-yellow color. \$1.00 to \$5.00.

Anglesite. Groups of fine adamantine crystals in well-defined habits of good size and perfection. \$.50 to \$4.00.

Cerussite. Solid reticulated masses of satiny-white prismatic crystals, making handsome examples of a familiar type. \$.50 to \$6.00.

Axinite. Occurs in a new and brilliant habit, the crystal edges being highly modified. Quite a different type from the acute-edged European examples. Often imbedded in granular Datolite. \$.25 to \$2.00.

Stannite, Zeehan. Another Australian occurrence which was first made generally available through our efforts. The new locality for this species yields specimens with a bluish tinge and a darker shade than the Cornish. \$.30 to \$2.00.

Zaratite, Heazlewood. Translucent emerald green surface on dark matrix. A new locality for an uncommon species. \$.30 to \$1.50.

Sulvanite, near Burra, South Australia. Sulpho-vanadate of copper. A pyrite-like mineral intimately associated with other copper minerals, the mixture resembling a blue-black, granular Chalcocite. \$.50 to \$2.00.

Stibiotantalite, Greenbushes, West Australia. Tantaloniobate of Antimony. Several recent visits by our traveller to the locality, permitted an extensive search for this rare and interesting new species. Much laborious washing and sorting of the tin sands, resulted in finding several ounces. From this we have sold to the leading museums and collectors. Our prices are less than half the wholesale figures at which we refused to buy one ounce of the mineral offered us a year ago by a correspondent near the locality. A few characteristic specimens of the pure mineral remain. Their identity has been confirmed by analysis. Some are associated with Tantalite. \$2.00 to \$10.00.

Tantalite. A new locality for the Tantalate of Iron. (Sp. gr. 7.6 to 7.8.) A century-old species which has been known in even the great collections by small and insignificant specimens. We have left a few authentic examples of good size. They are pure masses, occasionally showing distinct crystals. \$1.00 to \$6.00.

Cassiterite. In excellent loose crystals of bright and well defined twinned forms. \$.20 to \$1.00.

Calaverite, Kalgoorlie, West Australia. Gold Telluride. A visit to the locality secured some examples of the mineral in bright veins and patches in the typical rock. They are especially rich "show-samples" of an ore which has made the region famous. \$1.00 to \$8.00.

Coloradoite, Kalgoorlie. Mercury Telluride. Typical black specimens in the usual ore. Some associated with the lighter Calaverite. Each piece has been analyzed. \$1.00 to \$5.00.

METEORITES.

A list of other falls represented in our stock will be mailed on application. Correspondence is solicited with any one wishing to buy, sell or exchange.

Tombigbee River Meteoric Iron. Plate XXVII. (W. M. Foote in *Am. Jour. Sci.*, Aug., 1899. *Note on a new Meteoric Iron found near the Tombigbee River in Choctaw and Sumpter Counties, Alabama, U. S. A.*) This meteorite is remarkable for the size and beauty of the rare

Schreibersite figures exhibited. These assume the curious and novel shape of vermiform and graphic characters, some of them terminating in angular crystallizations. A glistening frosted effect on the etched surface suggests a metallic sunstone. The illustration poorly represents the oddity and beauty of the specimen, yet indicate the unique features which establish for it a separate position among the siderites. Composition of the metallic portion: Iron, 95.02; Nickel, 4.11; Cobalt, .40; Phosphorus, .324; Carbon, .161; Sulphur trace; Total, 100.015.

The six masses, having a total weight of 43,795 grams, were found between 1859 and 1886.

The entire find was secured by us, although only a portion shows the Schreibersite figures. A few slabs and end pieces of the best quality remain on sale. One of these splendid examples of Schreibersite, a meteoric species rarely found in good specimens, should be in every large mineral collection.

Canon Diablo, Arizona, Diamondiferous Meteoric Iron. Plate XXVIII. Collected in '91 by Dr. A. E. Foote and analyzed by Prof. G. A. Koenig, who discovered diamonds in the iron. It contains about 90 per cent. iron, with varying amounts of nickel, cobalt, carbon, etc.

Dr. Foote called the attention of the scientific world to the discovery, in a paper read by him before a meeting of the American Association for the Advancement of Science, held in Washington, D. C., August 20, 1891. (*A New Locality for Meteoric Iron with a Preliminary Notice of the Discovery of Diamonds in the Iron.*) The announcement awakened much interest, which was reflected in both the popular and scientific journals, and more or less serious speculation was indulged in as to this new source of Diamonds.

The character of the iron led other eminent chemists and high authorities on meteorites, to investigate it, and prove the presence of Diamonds, irregularly disseminated throughout different specimens



PLATE XXVIII.
DIAMONDIFEROUS METEORIC IRON. CANON DIABLO, ARIZONA. REDUCED 2/3.



PLATE XXIX.

METEORIC IRON, SACRAMENTO MTS., NEW MEXICO. WEIGHT, ENTIRE, 237 KILOS. NUMEROUS COMPLETE SECTIONS WERE SAWN FROM THE TOP AND BOTTOM. THE CENTRAL PORTION OUTLINED IS IN ONE PIECE, WEIGHING 81 KILOS.

examined. No Diamonds of any commercial value have been found; the white crystals were very minute, the larger ones being simply rough black Diamonds.

An interesting hypothesis was discussed by Prof. G. K. Gilbert concerning the origin of a non-volcanic crater, about three-quarter mile wide and 600 feet deep, formed in the center of the level plain, the iron having been found about this crater. Various facts were reviewed, suggesting that this depression in the earth's crust may have been caused by a colliding star of iron, about one-eighth mile diameter, the Limonite, so abundant near by, forming the oxidized portion.

We have masses similar to the one illustrated, at prices lower than asked for any other recorded fall. We have sawed two large masses into complete sections of 4 or 5 cm. thickness and 30 to 40 cm. breadth. Several large end pieces showing the pitting finely are on sale. This work was accomplished at almost prohibitive cost on account of the great hardness of the metal, due to the presence of the minute diamonds throughout the mass. A rare opportunity for museums or collectors to secure an object of great interest.

Limonite, the oxidized portion (?). Pieces $1\frac{1}{2}$ to 4 in. \$.50 to \$2.00.

Sacramento Mountains (N. M.) Meteoric Iron. Plates XV. and XXIX. (W. M. Foote, *Am. Jour. Sci.*, Jan., 1897. *Note on a New Meteorite from the Sacramento Mountains, Eddy County, New Mexico.*) This mass of iron is believed to be the meteor seen to fall at this place in 1876. No fragments could be found and the specimen appeared to be complete, weighing when found 237 kilos. The two ends are sawed off, leaving it 20 cm. high and forming a base about 25 x 8 cm., the top measuring about 65 x 14 cm. It has a level etched surface, showing a large Troilite nodule and the perfect crystallization of the iron (see Plate XV., p. 89). This characteristic octahedral crystallization is plainly exhibited on the fractured edges. A deep, round pit, 10 cm. in diameter, constitutes a curious feature. The exterior is covered with the peculiar "thumb-marks," common in meteoric irons.

Analysis of a metallic sample gave: Iron, 91.39; Nickel, 7.86; Cobalt, .52=99.77.

The main mass now weighs 81 kilos. Plate XXIX.

We offer slices of 25 grams each, up to complete sections of 6,500 grams. These are sawn from the top and are of uniform thickness. The larger ones exhibit several Troilite nodules and make magnificent museum specimens.

Terrestrial Iron, Disco Island, Greenland. Pieces of the mass found and originally described by Prof. Nordenskiöld. They are typical examples of the only Terrestrial iron obtainable. \$1.50 to \$12.00.

Index to Dana's Classification and Price List of Single Specimens.

The numbers preceding the names refer to their order in Dana's Classification. Where "r" follows the name it is a sub-species, *related* to or near the species, the number of which precedes the name; when followed by "v," it is a *variety*; followed by "s," a *synonym*; followed by "ap," a name in the group *appendix* following the number given. "H" designates *Hydrocarbons*; "N," minerals, generally *new*, described in the Supplement and Appendix.

Prices are quoted on minerals ordinarily in stock. Generally those not priced are exceedingly rare, and only a small proportion of them can be supplied. The prices given are for typical examples; the lowest for good study specimens, usually of the standard Student's size, 7 x 5 cm. (2 $\frac{3}{4}$ x 2 in.). The highest price generally refers to choice cabinet and large museum specimens. Small pieces may often be had at less than the minimum prices, and exceptional specimens may bring more than the maximum.

Many specimens are well crystallized and of attractive appearance, but a large proportion are only found in small crystals or masses. Preceding is an illustrated account describing "Choice Minerals" and "Meteorites." See also "Crystallography." Minerals sold by weight are priced in the "Laboratory List." Convenient and briefly descriptive is the "Price List of Individual Specimens of the Commoner Minerals, Including the Kinds Used in Elementary Study." See pp. 90-93, Part I.

744.	Abraum salts, r.,	\$	\$	138.	Aikinite,	\$1.50 to \$6.00
447.	Acadialite, v., . . .	.25 to	1.50	248.	Ainalite, r., . . .	
57.	Acanthite, . . . . .	.75 "	4.00	H.	Ajkite	
819.	Achrematite, r., . .			391.	Akermanite, r., . .	
426.	Achroite, v., . . . .	.50 "	2.50	63.	Alabandite, . . . .	.40 " 3.00
366.	Achtaragdite, r., . .			746.	Alabaster, v., . . .	.10 " .40
326.	Acmite, . . . . .	.25 "	1.00	325.	Alalite, v., . . . .	.40 " 1.50
338.	Actinolite, v., . . .	.15 "	.75	118.	Alaskaite, s., . . .	1.50 " 6.00
563.	Adamite, . . . . .	.50 "	3.00	H.	Albertite, . . . . .	.10 " .40
458.	Adamsite, v., . . .			435.	Albine, v., . . . . .	.20 " 1.00
N.	Adelite,			316.	Albite, . . . . .	.10 " 1.50
524.	Adelpholite, r., . .			242.	Alexandrite, v., . .	.50 " 8.00
447.	Adipite, v.,			N.	Alexandrolite, . . .	
313.	Adularia, v., . . . .	.30 "	2.50	38.	Algodonite,	
445.	Ædelforsite, v., . .			483A.	Alpite, r.,	
326.	Aegirite, s., . . . .	.25 "	1.00	45.	Alisonite, r., . . .	
343.	Ænigmatite,	1.00 "	5.00	578.	Allactite, . . . . .	.50 " 2.00
532.	Æschynite,	1.00 "	4.00	335.	Allagite, r.,	
458.	Agalmatolite, r., . .	.20 "	1.00	409.	Allanite, . . . . .	.20 " 1.00
270.	Agaric mineral, v., .	.10 "	.50	9.	Allemontite, . . . .	.20 " .75
210.	Agate, v., . . . . .	.10 "	2.00	102.	Alloclasite, . . . .	.75 " 3.00
210.	Agate-Jasper, v., . .	.30 "	1.50	719.	Allomorphite, v., . .	
306.	Agnesite, r.,			24.	Allopalladium, . . .	
373.	Agricolite,			498.	Allophane, . . . . .	.25 " 1.25
N.	Agularite,	1.00 "	10.00	509.	Allophite, ap., . . .	

544.	Alluaudite, r., . . . \$	\$	9.	Antimonial Arsenic, r., \$	\$
370.	Almandite, v.,20 to	3.00	221.	Antimonial Ocher, s., .20 to	.75
510.	Alshedite, v.,		144.	" Red Silver, s., .50 "	6.00
278.	Alstonite, s.,75 "	2.50	10.	Antimony,40 "	2.00
46.	Altaite,1.00 "	4.00	9.	" Arsenical, s., .20 "	.75
769.	Alum, Iron, s., . . .25 "	1.00	28.	" Glance, s., .20 "	10.00
764.	" Native, s., . . .20 "	1.00	741.	Antlerite, r.,	
	Alums, 764-770, . . .		175.	Antozonite, v., . . .	
736.	Alumian,		455.	Antrimolite, v., . . .	
791.	Aluminite,20 "	.75	789.	Apatelite, r.,25 "	1.00
212.	Alumocalcite, v., . .		549.	Apatite,10 "	3.00
800.	Alumstone, s., . . .10 "	.75	270.	Aphrite, v.,	
800.	Alunite,10 "	.75	426.	Aphrizite, v.,	
775.	Alunogen,15 "	.50	481.	Aphrodite, r., . . .35 "	1.50
462B.	Alurgite, r.,		477.	Aphrosiderite,	
394.	Alvite, r.,50 "	2.00	717.	Aphthitalite,75 "	4.00
17.	Amalgam,75 "	3.00	770.	Apjohnite,	
13.	" Gold, r.,		370.	Aplome, v.,50 "	2.00
17.	" Silver, s., . . .75 "	3.00	435.	Apophyllite,40 "	6.00
787.	Amarantite,75 "	4.00	509.	Aquacreptite, ap., .20 "	.75
315.	Amazonite, v., . . .25 "	7.00	344.	Aquamarine, v., . . .40 "	2.50
315.	Amazon stone, v., .25 "	7.00	223.	Aqueous Vapor, s., .	
H.	Amber, Succinite, .50 "	3.00	277.	Aragonite,50 "	8.00
559.	Amblygonite, . . .20 "	.75	H.	Aragotite,	
324.	Amblystegite, v., .		717.	Arcanite, r.,	
H.	Ambrite,20 "	1.00	509.	Arctolite, ap., . . .	
H.	Ambrosine,		418.	Ardennite,	
470.	Amesite, r.,		675.	Arequipite, r., . . .	
210.	Amethyst, v., . . .30 "	7.00	342.	Arfvedsonite, . . .50 "	2.00
338.	Amianthus, s. v., .20 "	.75	45.	Argentiferous Ga-	
675.	Ammiolite, r., . . .		lena, v.,50 "	3.00	
338.	Amphibole,10 "	7.00	270.	Argentine, v., . . .15 "	.75
611.	Amphithalite, r., .		42.	Argentite,40 "	8.00
450.	Analcite,40 "	2.00	56.	Argentopyrite, r., .	
252.	Anatase, s.,50 "	2.50	163.	Argyrodite,2.00 "	12.00
398.	Andalusite,20 "	1.50	56.	Argyropyrite, r., .	
318.	Andesine,10 "	.50	253.	Arkansite, v., . . .40 "	3.50
318.	Andesite, s., . . .10 "	.50	780A.	Arnimite,	
N.	Andorite		768.	Aromite, r.,	
370.	Andradite, v., . . .20 "	1.50	17.	Arquerite, v., . . .75 "	3.00
656.	Andrewsite, r., . .		535.	Arrhenite, ap., . .	
721.	Anglesite,50 "	10.00	35.	Arsenargentite, r., .	
722.	Anhydrite,10 "	.75	8.	Arsenic.,40 "	4.00
35.	Animikite, r., . . .		9.	" Antimonial, r., .	
271A.	Ankerite,40 "	2.50	213.	" White, s.,	
602.	Annabergite, . . .35 "	1.50	87.	Arsenical Cobalt, s., .50 "	3.00
530.	Annerödite, . . .75 "	4.00	71.	" Nickel, s., .40 "	3.00
462B.	Annite, s.,30 "	1.25	98.	" Pyrites, s., .10 "	1.50
462.	Anomite, v.,		145.	" Red Sil-	
320.	Anorthite,30 "	1.25	ver, s., .50 "	8.00	
315A.	Anorthoclase, . . .		35.	" Silver, r.,	
325.	Anthochroite, v., .		582.	Arseniopelite, . . .	
337.	Anthophyllite, . . .10 "	.75	577.	Arseniosiderite, . .35 "	1.50
505.	Anthosiderite, r., .		8.	Arsenolamprite, r., .	
H.	Anthracite,10 "	.40	213.	Arsenolite,	
H.	Anthracoxenite, . .		98.	Arsenopyrite, . . .10 "	1.50
H.	Anthraxolite, . . .		108.	Arsenotellurite, ap.,	
481.	Antigorite, v., . . .		338.	Asbeferrite, v., . .	
509.	Antillite, ap., . . .		338.	Asbestos, v., . . .15 "	.75

481.	Asbestus, v., . . .	\$.15 to \$.75	719.	Barite,	\$.10 to \$6.00
210.	Asbestus in		342A.	Barkevikite, . . .	
	Quartz, v., . . .	.50 " 3.00	83.	Barnhardtite, r., .	.25 " 1.00
269.	Asbolite, r., . . .	.20 " .75	N.	Barracanite, . . .	
	N. Ascharite, . . .		610.	Barrandite, . . .	
211.	Asmanite, r., . .		320.	Barsowite, r., . .	
549.	Asparagus-stone, v.,	.50 " 2.00	801.	Bartholomite, r., .	
504.	Asperolite, v., . .		430.	Barylite, ap., . . .	
	H. Asphaltum, . . .	.10 " .40	354.	Barysilite,	
462A.	Aspidolite, r., . .		462.	Barytbiotite, v., .	
210.	Asteriated Quartz,		719.	Barytes, s., . . .	.10 " 6.00
	s. v.,		282.	Barytoalcite, . . .	.40 " 1.50
231.	" Sapphire, s.,	.50 " 3.00	720.	Barytocelestite, v.,	
325.	Asteroite, v., . .		210.	Basanite, v., . . .	.15 " .50
	N. Astochite, . . . .	.50 " 2.00	233.	Basanomelan, v., .	
758.	Astrakanite, v., .	.20 " 1.50	324.	Bastite, r., . . . .	.25 " 1.25
514.	Astrophyllite, . .	.20 " 1.50	285.	Bastnäsité, . . . .	.75 " 3.00
193.	Atacamite, . . . .	.30 " 4.00	462.	Bastonite, r., . .	
584.	Atelestite,	1.00 " 5.00	H.	Bathvillite, . . .	
193.	Atelite, r.,		374.	Batrachite, v., . .	
389.	Atheriastite, r., .		261.	Bauxite, . . . . .	.10 " .40
289.	Atlasite, r., . . .		629.	Bayldonite, . . .	
669.	Atopite,		N.	Beaconite,	
645.	Attacolite, r., . .		394.	Beccarite, v., . . .	
394.	Auerbachite, r., .		709.	Bechilite,	
395.	Auerlite, r., . . .		155.	Beegerite,	
645.	Angelite, r., . . .		210.	Beekite, v., . . . .	.15 " .75
325.	Augite, v., . . . .	.30 " 4.00	820.	Belonesite,	
353.	Auralite, r., . . .		507.	Bementite, . . . .	.75 " 4.00
290.	Aurichalcite, . . .	.20 " 2.00	648.	Beraunite, . . . .	.40 " 1.50
236.	Automolite, v., . .	.50 " 2.00	H.	Berengelite, . . .	
661.	Autunite, . . . . .	.50 " 3.00	N.	Beresovite,	
458.	Avalite, v., . . . .	.50 " 2.50	338.	Bergamaskite, v.,	
506.	Avasite, r.,		453.	Bergmannite, v., .	
	Aventurine Feld-		479.	Berlauite, r., . . .	
	spar, v. of 316		645.	Berlinite, r., . . .	
	and 317, . . . . .	.75 " 4.00	269.	Bernonite, ap., . .	
210.	Aventurine Quartz,		473.	Berthierine, r., . .	
	v., . . . . .	.75 " 2.00	119.	Berthierite, . . . .	.75 " 3.00
	Awaruite, v., . . .		422.	Bertrandite,	1.00 " 6.00
410.	Axinite, . . . . .	.25 " 7.00	344.	Beryl, . . . . .	.10 " 3.00
394.	Azorite, v.,		546.	Beryllonite, . . . .	.40 " 1.50
289.	Azurite, . . . . .	.50 " 6.00	49.	Berzelianite, . . .	1.50 " 7.00
			538.	Berzeliite, . . . .	.75 " 4.00
210.	Babel-quartz, v., .	.40 " 1.50	680.	Beudantite, . . . .	.40 " 1.50
336.	Babingtonite, . . .	1.50 " 8.00	407.	Beustite, v., . . .	
	N. Baddeckite, . . .		76.	Beyrichite,	
	N. Baddeleyite, . . .		509.	Bhreckite, ap., . .	
409.	Bagrationite, v., .		754.	Bieberite,	
325.	Baikalite, v., . . .		H.	Bielzite,	
	H. Bakerinite, . . .		497.	Biharite, r., . . .	
234.	Balas Ruby, s. v.,	.25 " 1.00	670.	Bindheimite, . . . .	.50 " 3.00
479.	Baltimorite, r., .	.15 " .75	123.	Binnite,	1.50 " 8.00
509.	Balvraidite, ap., .		320.	Biotine, v.,	
399.	Bamlite, v.,		462.	Biotite, . . . . .	.10 " 1.00
210.	Banded Agate, v.,	.15 " 3.00	270.	Bird's-eye Mar-	
675.	Barcenite, r., . . .	.75 " 3.00		ble, v., . . . . .	.20 " .75
509.	Barettite, ap., . .		197.	Bischofite, . . . .	.25 " 1.00
270.	Baricalcite, v., . .		217.	Bismite,	1.00 " 4.00

11.	Bismuth,	\$.50 to \$3.00	509.	Bravaisite, ap., . . .	\$	\$
13.	Bismuth-gold, v.,		N.	Brazilite,		
29.	Bismuthinite, . .	.50 " 2.00	270.	Breccia Marble, v.,	.20 to	.75
217.	Bismuth Ocher, s.,	1.00 " 4.00	338.	Breislakite, v., . .	.40 " 2.00	
306.	Bismutite, . . . .	.75 " 6.00	72.	Breithauptite, . .	.75 " 2.50	
430.	Bismutoferrite, ap.		272.	Breunnerite, s., .	.10 " 1.00	
N.	Bismutosmaltite, .		439.	Brewsterite, . . .	.75 " 3.00	
283.	Bismutosphärite, .		3.	Brimstone, s., . .	.20 " 6.00	
H.	Bitumen, s. Elaterite, . . . . .	.15 " .50	153.	Brittle Silver, s., .	.75 " 6.00	
H.	Bituminous Coal, .	.10 " .40	740.	Brochantite, . . .	.40 " 2.00	
N.	Bixbyite,		711.	Bröggerite, v., . .	1.00 " 8.00	
230.	Black Copper, s., .	.40 " 1.50	278.	Bromlite, . . . . .	.75 " 2.50	
338.	" Hornblende, v.,	.10 " 3.00	171.	Bromyrite,	1.50 " 7.00	
58.	" Jack, s., . . .	.10 " 8.00	132.	Brongniardite, . .		
2.	Black Lead, s., . .	.15 " .75	323.	Bronzite, v., . . .	.15 " .50	
270.	" Marble, v., . .	.10 " .40	253.	Brookite, . . . . .	.40 " 3.00	
462.	" Mica, s., . . .	.10 " 1.00	259.	Brown Clay-iron-stone, v., . . . .	.10 " .40	
210.	" Tourmaline in Quartz, v., . . .	.20 " 8.00	H.	Brown Coal, . . . .	.10 " .40	
45.	Bleichschweif, v., .		259.	Brown Hemitite, s., . . . . .	.10 " .75	
58.	Blende, s., . . . .	.10 " 8.00	257.	Brown Iron-ore, s.,	.25 " 1.50	
N.	Bliabergsite, . . .		259.	Brown Iron-stone, s.,	.10 " .75	
758.	Blödite, . . . . .	.20 " 1.50	271.	Brown Spar, s., . .	.10 " 4.00	
535.	Blomstrandite, ap.		262.	Brucite, . . . . .	.30 " 2.00	
210.	Blood-stone, v., .	.25 " 2.00	H.	Brücknerellite, .		
597.	Blue Iron Earth, s.,	.50 " 2.00	175.	Bruiachite, r., . .		
N.	Blueite,		270.	Brunnerite, v., . .		
755.	Blue Vitriol, s., .	.30 " 1.50	618.	Brushite,		
599.	Bobierite,		H.	Bucaramangite, .		
409.	Bodenite, r., . . .		409.	Bucklandite, v., .		
269.	Bog Manganese, r.,	.20 " 1.00	210.	Buhrstone, v., . .	.10 " .40	
259.	" Ore, v., . . . .	.10 " .40	227.	Bunsenite,		
493.	Bole, v., . . . . .	.10 " .50	770.	Bushmanite, r., . .		
N.	Bolélite, . . . . .	.20 " 3.00	173.	Bustamentite, r.,		
108.	Bolivianite, ap., .		335.	Bustamite, v., . .		
29.	Bolivite, r., . . .		H.	Byerite,		
719.	Bologna Stone, v.,	.20 " 1.00	338.	Byssolite, v., . . .	.10 " .75	
375.	Boltonite, v., . .	.20 " .75	603.	Cabrerite,		
H.	Bombiccite, . . . .	.40 " 2.00	212.	Cacholong, v., . .	.25 " 1.50	
698.	Boracite, . . . . .	.20 " 2.50	392.	Cacoclasite, r., . .	.25 " 2.00	
707.	Borax, . . . . .	.20 " .75	647.	Cacoxenite, . . . .	.40 " 2.00	
169.	Bordosite, r., . .		210.	Cairngorm Stone, s.,	.10 " 3.00	
265.	Boric Acid, s., . .		H.	Caking (coking) Coal, . . . . .	.10 " .40	
653.	Borickite,		423.	Calamine, . . . . .	.25 " 4.00	
78.	Bornite, . . . . .	.30 " 5.00	105.	Calaverite, r., . .	1.00 " 15.00	
708.	Boronatrocalsite, s.	.30 " 1.50	719.	Calcareaobarite, v.,		
1.	Bort, v., . . . . .	.50 " 8.00	270.	Calcareous Marl, v.,	.10 " .50	
798.	Botryogen,		720.	Calciocelastite, v.,		
401.	Botryolite, v., . .	.40 " 1.50	652.	Calcioferrite, . . .		
139.	Boulangerite, . .	.50 " 2.00	395.	Calciothorite, r.,		
751.	Bourbolite, r., . .		565.	Calciovolborthite,		
136.	Bournonite, . . . .	.50 " 4.00	270.	Calcite, . . . . .	.10 " 9.00	
759.	Boussingaultite, .		228.	Calcozincite, v., .	.40 " 3.00	
481.	Bowenite, v., . . .		270.	Calc Spar, s., . .	.10 " 9.00	
566.	Brackebuschite, .	.50 " 2.50	270.	Calc Tufa, v., . .	.10 " .40	
465.	Brandisite, v., . .	.40 " 2.50	370.	Calderite, v., . . .		
591.	Brandtite, . . . .	.75 " 3.00				
247.	Braunite, . . . . .	.40 " 1.50				

739.	Caledonite,	\$.75 to \$3.00	435.	Chalcomorphite, r.,	\$.	\$.
612.	Callainite,		268.	Chalcophanite, . .	.20	" 1.00
164.	Calomel,	2.00 " 9.00	636.	Chalcophyllite, . .	.75	" 5.00
719.	Calstronbarite, v.,		83.	Chalcopyrite, . . .	.20	" 3.00
551.	Campylite, v., . . .	.50 " 3.00	81.	Chalcopyrrhotite, r.,		
325.	Canaanite, v., . . .		656.	Chalcosiderite, . .	.50	" 3.00
360.	Cancrinite, . . . .	.30 " 1.00	117.	Chalcostibite, . . .		
N.	Canfieldite,		224.	Chalcotrichite, v.,	.30	" 2.00
67.	Cannel Coal, . . . .	.10 " .40	456.	Chalilite, v., . . .		
445.	Caporcianite, v., . .		270.	Chalk, v., . . . . .	.10	" .40
210.	Capped Quartz, v., .	.50 " 2.50	484.	" French, v., . . .	.10	" .40
347.	Cappelenite,		273.	Chalybite, s., . . .	.10	" 3.00
729.	Caracolite,		25.	Chalypite, r., . . .		
1.	Carbonado, v., . . .	2.00 " 10.00	473.	Chamosite, r., . . .	.25	" 1.00
541.	Carminite,		H.	Chemawinite, . . .		
201.	Carnallite, . . . . .	.15 " .50	655.	Chenevixite,		
210.	Carnelian, v., . . .	.10 " .75	550.	Cherokine, v., . . .		
N.	Carnotite, . . . . .	.75 " 4.00	210.	Chert, v., . . . . .	.10	" .40
498.	Carolathine, r., . .	.40 " 1.50	289.	Chessylite, s., . . .	.50	" 6.00
424.	Carpholite, . . . . .	.40 " 2.00	315.	Chesterlite, v., . .	.20	" .75
790.	Carphosiderite, . .	.50 " 2.00	398.	Chiastolite, v., . .	.40	" 1.50
82.	Carrollite,		649.	Childrenite, . . . .	.40	" 2.00
540.	Caryinite, . . . . .	.50 " 2.50	567.	Chileite, r.,		
349.	Caryocerite, . . . .		.40	Chilenite,		
508.	Caryopillite, . . . .	.40 " 1.50	683.	Chile Saltpeter, s.,	.10	" .40
248.	Cassiterite, . . . . .	.10 " 3.00	492.	China Clay, s., . .	.10	" .40
783.	Castanite,		184.	Chiolite, . . . . .	.50	" 2.50
510.	Castellite, r., . . .		111.	Chiviatite,		
78.	Castillite, r., . . .		323.	Chladnite, v., . . .		
310.	Castorite, v., . . . .	.50 " 2.00	88.	Chloanthite, . . . .	.50	" 4.00
N.	Cataphorite,		179.	Chloralluminate, r.,		
346.	Catapleiite, . . . .	.50 " 2.00	549.	Chlor-apatite, v., .		
458.	Cataspillite, r., . .	.15 " .50	457.	Chlorastrolite, ap.,	.25	" 3.00
500.	Catlinite, ap., . . .	.10 " .40		Chlorite Group,		
210.	Cat's-Eye, v., . . . .	.50 " 2.50		468-479,		
242.	Cat's-Eye, v.,	1.00 " 5.00	210.	Chloritic Quartz, v.,	.30	" 4.00
210.	Cavernous Quartz,		466.	Chloritoid, . . . . .	.10	" .40
v., . . . . .		.25 " 1.50	176.	Chloromagnesite,		
361.	Cavolinite, r., . . .	.25 " 1.00	328.	Chloromelanite, v.,		
489.	Celadonite, . . . . .	.20 " .75	505.	Chloropal, . . . . .	.25	" 1.25
720.	Celestite, . . . . .	.10 " 6.00	479.	Chlorophæite, r., .	.20	" .75
719.	Celestobarite, v., .		353.	Chlorophyllite, r.,	.10	" .50
N.	Celsian,		234.	Chlorospinel, v., .		
501.	Cenosite,	1.50 " 7.00	729.	Chlorothionite, r.,		
435.	Centrallassite, r.,		712.	Chlorothorite, r.,		
169.	Cerargyrite, . . . .	.40 " 6.00	596.	Chlorotile, r., . . .		
353.	Cerasite, v.,		184.	Chodneffite, r., . .		
425.	Cerite, . . . . .	.50 " 2.00	572.	Chondarsenite, . . .		
481.	Cerolite, r.,		415.	Chondrodite, . . . .	.30	" 5.00
281.	Cerussite, . . . . .	.30 " 12.00	N.	Chondrostibian, . .		
221.	Cervantite, . . . . .	.20 " .75	509.	Chonierite, ap., . .		
234.	Ceylonite, v., . . .	.30 " 1.50	H.	Chrismatite,		
447.	Chabazite, . . . . .	.25 " 4.00	320.	Christianite, v., . .		
755.	Chalcanthite, . . . .	.30 " 1.50	58.	Christophite, v., . .		
210.	Chalcedony, v., . . .	.20 " 1.50	325.	Chrome-diopside, v.,		
54.	Chalcocite, . . . . .	.30 " 6.00	500.	Chrome Ocher, ap.,	.50	" 2.00
474.	Chalcodite, v., . . .	.25 " 1.25	462.	Chromglimmer, v.,		
811.	Chalcomenite, . . .		241.	Chromic Iron, s., . .	.10	" .50
			241.	Chromite, . . . . .	.10	" .50

370.	Chromium Garnet (s. Uvarovite), v. \$.50 to \$2.00	37.	Condurrite, v., . . . \$1.00 to \$5.00
241.	Chrompicotite, v.,	628.	Conichalcite,50 " 3.00
242.	Chrysoberyl,40 " 3.00	486.	Connarite,
504.	Chrysocolla,25 " 1.50	731.	Connellite,1.00 " 4.00
376.	Chrysolite,10 " .50	460.	Cookeite, r.,20 " .75
210.	Chrysoprase, v., . .50 " 2.50	H.	Copalite,20 " .75
481.	Chrysotile, v., . . .25 " 1.50	H.	Copalite cont. in-
606.	Churchite,		sects,40 " 2.00
495.	Cimolite,20 " .75	784.	Copiapite,30 " 2.00
66.	Cinnabar,40 " 7.00	15.	Copper,10 " 1.50
370.	Cinnamon-stone, v., .20 " 5.00	108.	Copper and Silver
676.	Ciplyte, r.,		Sulphide, ap., .
576.	Cirrolite,	751.	Copperas, s., . . .30 " 1.25
210.	Citrine (Yellow	54.	Copper Glance, s., .30 " 6.00
	Quartz), v., . . .40 " 1.50	504.	Copper Pitch-
158.	Clarite, r.,		blende, v., . . .
215.	Claudetite,	83.	Copper Pyrites, s., .20 " 3.00
47.	Clausthalite,75 " 3.00	659.	Copper-Uranite, s., .10 " 4.00
232.	Clay Iron-stone, v., .10 " .40	772.	Coquimbite,30 " 1.50
149.	Clayite, r.,	711.	Coracite, r., . . .
316.	Cleavelandite, v., . .10 " .40	353.	Cordierite, s., . . .50 " 3.00
58.	Cleiothane, v., . . .20 " .75	634.	Cornwallite, . . .
711.	Cleveite, v., . . .1.00 " 5.00	675.	Coronguite, r., . .
1.	Cliftonite, r., . . .	470.	Corundophilite, . .25 " 1.00
468.	Clinocllore,20 " 2.00	231.	Corundum,10 " 6.00
571.	Clinoclasite,50 " 2.00	91.	Corynite,75 " 2.50
801.	Clinocrocoite, r., .	128.	Cosalite,75 " 3.00
N.	Clinohedrite, . . .	N.	Cosmochlore, . . .
416.	Clinohumite, . . .	459.	Cossaite, v., . . .
801.	Clinophæite, r., .	343.	Cossyrite, v., . . .
N.	Clinozoisite,50 " 3.00	180.	Cotunnite,40 " 2.00
465.	Clintonite, v., . . .40 " 2.00	388.	Couseranite, v., . .20 " .75
H.	Cloustonite, . . .	67.	Covellite,50 " 3.50
450.	Cluthalite, r., . .	245.	Crednerite,
H.	Coal, Anthracite, .10 " .40	233.	Crichtonite, v., . .
H.	" Bituminous, .10 " .40	211.	Christobalite, r., .
H.	" Brown,10 " .40	341.	Crocidolite,20 " 1.00
H.	" Caking,10 " .40	725.	Crocoisite, s., . . .50 " 25.00
H.	" Cannel,10 " .40	725.	Crocoite,50 " 25.00
H.	" Mineral,10 " .40	472.	Cronstedtite,75 " 4.00
H.	" Non-Caking, .10 " .40	53.	Crookesite,1.50 " 8.00
601.	Cobalt Bloom, s., . .50 " 3.00	N.	Crossite,
89.	" Glance, s., . . .30 " 5.00	98.	Crucite, r.,
89.	Cobaltite,30 " 5.00	183.	Cryolite,15 " 4.00
811.	Cobaltomenite, r.,	461.	Cryophyllite, v., . .50 " 2.00
79.	Cobalt Pyrites, s., 1.00 " 4.00	553.	Cryphiolite, r., . .
173.	Coccinite, r., . . .	185.	Cryptohalite, r., .
325.	Coccolite, v., . . .10 " .40	708.	Cryptomorphite, r.,
96.	Cockscomb Pyrites,	N.	Cryptovalite, . . .
	v.,20 " 2.50	N.	Cubaite,
645.	Cœruleolactite, r., .20 " .75	N.	Cubeite,
704.	Colemanite,50 " 7.00	480.	Culsageeite, v., .
586.	Collophanite, . . .	N.	Cumengéite, v., . .50 " 4.00
499.	Collyrite,	338.	Cummingtonite, v., .20 " .75
370.	Colophonite, v., . .20 " .75	14.	Cupriferous Sil-
62.	Coloradoite,1.00 " 5.00		ver, v.,
525.	Columbite,30 " 8.00	224.	Cuprite,20 " 3.00
212.	Common Opal, v., .25 " 4.00	549.	Cupro-apatite, v.,
		112.	Cuprobismutite, .

N.	Cuprocassiterite, . \$	\$	458.	Didymite, v., . . . \$	\$
564.	Cuprodescloizite, v., .25	to 1.50	771.	Dietrichite, . . .	
N.	Cuproidargyrite,		569.	Dihydrite, . . .	
754.	Cupromagnesite, r.,		716.	Dihydro-thenavd-	
45.	Cuproplumbite, r.,			ite, r.,	
815.	Cuprotungstite, .		504.	Dillenburgite, v., .	
413.	Cuspidine,		499.	Dillnite, r., . . . .	.50 to 2.50
400.	Cyanite,20	" 15.00	27.	Dimorphite, r., .	
504.	Cyanochalcite, v.,		H.	Dinite,	
761.	Cyanochoite, . .		325.	Diopside, v., . . . .	.40 " 3.00
781.	Cyanotrichite, . .	.75 " 3.00	383.	Diopside, . . . . .	.50 " 8.00
N.	Cylindrite, . . . .	.50 " 2.50	388.	Dipyre, v., . . . .	.30 " 1.50
327.	Cymatolite, r., . .	.25 " 1.00	400.	Disthene, s., . . .	.20 " 15.00
393.	Cyprine, v., . . . .	.30 " 1.25	585.	Dittmarite, r., . .	
795.	Cyprusite,		112.	Dognacskaite, r., .	
394.	Cyrtolite, r., . . .	.40 " 1.50	270.	Dog-tooth Spar v.,	.15 " 6.00
676.	Dahllite, . . . . .	.50 " 2.50	738.	Dolerophanite, . .	
57.	Daleminzite, r., .		271.	Dolomite, . . . . .	.10 " 2.00
458.	Damourite, v., . .	.20 " .75	37.	Domeykite, . . . .	.40 " 5.00
98.	Danaite, v.,		H.	Dopplerite,	
367.	Danalite,		270.	Doubly Refracting	
396.	Danburite, . . . . .	.50 " 3.00		Spar, s., . . . . .	.30 " 4.00
338.	Dannemorite, v., .		200.	Douglasite,	
471.	Daphnite,		719.	Dreelite, r., . . . .	.50 " 2.00
689.	Darapskite,		210.	Drusy Quartz, v., .	.10 " .40
401.	Datolite, . . . . .	.20 " 1.50	83.	Ducktownite, r., .	
194.	Daubréeite,		480.	Dudleyite, r., . .	
80.	Daubreelite,		573.	Dufrenite, . . . . .	.25 " 1.50
344.	Davidsonite, v., .		127.	Dufrenoyite, . . .	1.00 " 6.00
190.	Daviesite,		479.	Dumasite, r., . . .	
509.	Davreuxite, ap., .		427.	Dumortierite, . . .	.30 " 2.00
361.	Davyne, r., . . . .	.30 " 1.50	768.	Dumreicherite, r.,	
293.	Dawsonite, . . . . .	.75 " 3.00	509.	Duporthite, ap., .	
564.	Dechenite, r., . . .		558.	Durangite, . . . . .	.40 " 1.50
506.	Degeröite, v., . . .		810.	Durdenite,	
269.	Delafossite, ap., .		141.	Dürfeldtite, r., . .	
648.	Delvauxite, r., . .		H.	Duxite,	
478.	Delessite, . . . . .	.20 " .75	519.	Dysanalyte, . . . .	.10 " 1.00
370.	Demantoid, v., . . .		35.	Dyscrasite,	1.50 " 8.00
504.	Demidovite, v., . .	.50 " 2.50	236.	Dysluite, v., . . . .	.50 " 7.00
N.	Derbylite,		H.	Dysodile,	
509.	Dermatin, ap., . . .		335.	Dyssnite, r.,	
483A.	De Saulesite, r., .	.75 " 3.00	458.	Dysyntribite, r., .	
564.	Descloizite, . . . .	.25 " 2.00	673.	Ecdemite, . . . . .	.50 " 2.00
443.	Desmine, s., . . . .	.20 " 2.00	329.	Edelforsite, v., . .	
677.	Destinezite, v., . .	.30 " 2.00	338.	Edenite, v., . . . .	.10 " .75
482.	Deweylite, . . . . .	.20 " 1.00	452.	Edingtonite,	2.00 " 8.00
476.	Diabantite, . . . . .	.20 " .75	25.	Edmonsonite, r., .	
324.	Diaclasite, r., . . .		719.	Eggonite, r.,	
677.	Diadochite, . . . . .	.30 " 1.50	570.	Ehlite, r.,	
325.	Diallage, v., . . . .	.15 " .75	500.	Ehrenbergit, ap., .	
274.	Diallogite, s., . . .	.50 " 15.00	262.	Eisenbrucite, r., .	
1.	Diamond, . . . . .	.50 " 10.00	233.	Eisenrosen, v. (or	
134.	Diaphorite,	1.50 " 7.00		v. 232), . . . . .	.75 " 12.00
256.	Diaspore, . . . . .	.50 " 9.00	479.	Ekmanite, r., . . .	
338.	Diastatite, v., . . .		357.	Elæolite, v., . . . .	.15 " .75
	Diatomaceous Earth	.10 " .40	H.	Elastic Bitumen, .	.15 " .50
588.	Dickinsonite,		H.	Elaterite, . . . . .	.15 " .50

13.	Electrum, v., . .	\$1.00 to \$15.00	368.	Eulytite,	\$1.50 to \$6.00
648.	Eleonorite, v., . .	.50 " 2.00	253.	Eumanite, r., . .	
453.	Ellagite, r., . . .		H.	Euosmite,	
183.	Elpasolite, r., . .		459.	Euphyllite, r., . .	.50 " 2.00
N.	Elpidite,	1.50 " 6.00	549.	Eupyrchroite, v., .	
170.	Embolite, . . . . .	.50 " 6.00	479.	Euralite, r., . . .	
344.	Emerald, v., . . . .	.50 " 3.00	564.	Eusynchite, r., . .	
303.	Emerald Nickel, s.,	.30 " 1.50	450.	Euthallite, v., . .	
231.	Emery, v., . . . . .	.10 " .50	534.	Euxenite,	1.00 " 5.00
809.	Emmonsite,		645.	Evansite, . . . . .	.40 " 1.50
116.	Emplectite, . . . .	.50 " 2.00	743.	Exanthalose, r., .	
158.	Enargite, . . . . .	.50 " 2.50	210.	Eye-Agate, v., . .	.75 " 3.00
270.	Encrinal Marble, v.,	.10 " .50			
551.	Endlichite, r., . .	.30 " 2.00	148.	Fahlerz, s., . . . .	.20 " 3.00
323.	Enstatite, . . . . .	.15 " 5.00	353.	Fahlunite, r., . .	.50 " 2.50
805.	Enysite, r.,		592.	Fairfieldite, . . .	
819.	Eosite, r.,		N.	Falkenhaynite, . .	
650.	Eosphorite,	1.50 " 6.00	159.	Famatinite,	1.00 " 4.00
509.	Ephesite, ap., . . .		453.	Fargite, v.,	
161.	Epiboulangerite, .		456.	Farcolite, v., . . .	
479.	Epichlorite, r., . .		325.	Fassaite, v., . . . .	.30 " 1.50
N.	Epididymite, . . . .	.50 " 2.00	451.	Faujasite, . . . . .	.40 " 1.50
407.	Epidote, . . . . .	.20 " 15.00	750.	Fauserite, r., . . .	
210.	Epidote in Quartz,		377.	Fayalite,	1.00 " 6.00
v.,		1.00 " 4.00	130.	Feather Ore, s., .	.30 " 4.00
162.	Epigenite,		N.	Fedorovite,	
379.	Epigenite, r., . . .			Feldspar Group,	
585.	Epiglaubite, r., .			313-320,	
479.	Epiphanite, r., . .		316.	" Soda, s., . . . .	.10 " 1.50
549.	Epiphosphorite, r.,		793.	Felsöbanyite, . . .	
457.	Episphärite, ap., .		812.	Ferberite, r., . . .	
440.	Epistilbite,	1.00 " 6.00	523.	Fergusonite, . . .	.50 " 2.50
748.	Epsomite, . . . . .	.25 " 1.50	376.	Ferrite, r.,	
748.	Epsom Salt, s., . .	.25 " 1.50	270.	Ferrocaltite, v., .	.30 " 2.00
350.	Erdmannite, r., . .		89.	Ferrocobaltite, v.,	
402.	" r.,		526A.	Ferro-ilmenite, r.,	
568.	Erinite, . . . . .	.40 " 2.00	777.	Ferronatrite, . . .	
N.	Erionite,		583.	Ferrostibian, r., .	
386.	Ersbyite, v.,		810.	Ferrotellurite, r.,	
78.	Erubescite, s., . .	.30 " 5.00	233.	Ferrozincite, r., .	
795.	Erusibite, r., . . .		210.	Ferruginous	
601.	Erythrite, . . . . .	.50 " 3.00		Quartz, v., . . . .	.10 " 1.00
193.	Erythrocalcite, r.,		719.	Fetid Barite, v., .	.10 " .50
199.	Erythrosiderite, .		270.	" Calcite, v., . .	
69.	Erythrozincite, r.,		505.	Fettbol, v.,	
407.	Escherite, v., . . .		788.	Fibroferrite, . . .	.50 " 2.50
370.	Essonite, v., . . . .	.20 " 2.00	399.	Fibrolite, v., . . .	.15 " .75
803.	Ettringite,		H.	Fichtelite, . . . . .	.25 " 1.00
51.	Eucairite,		191.	Fiedlerite,	
632.	Euchroite, . . . . .	.75 " 4.00	149.	Fieldite, r.,	
403.	Euclase,	2.00 " 15.00	589.	Fillowite,	
345.	Eucolite, v., . . . .	.75 " 2.50	212.	Fiorite, v., . . . .	.25 " 1.00
510.	Eucolite-titanite, v.,		212.	Fire-opal, v., . . .	.20 " 1.50
395.	Eucrasite, r., . . .		640.	Fischerite,	
358.	Eucryptite,		250.	Flêches d'Amour, s.,	.40 " 6.00
345.	Eudialyte, . . . . .	.75 " 2.50	210.	Flexible Sandstone, v	.10 " .75
312.	Eudidymite, . . . .	.40 " 1.50	580.	Flinkite,	
450.	Eudnophite, v., . .	.50 " 2.00	210.	Flint, v., . . . . .	.10 " .40
462.	Eukamptite, r., . .		212.	Float-stone, v., . .	

277.	Flos-ferri, v., . . .	\$.20 to \$3.00	H.	Geocerellite, . . .	\$	\$
203.	Fluellite,		H.	Geocerite,		
196.	Fluocerite, . . . . .	.75 " 3.00	152.	Geocronite, . . . .	.75 to 4.00	
175.	Fluor, s., . . . . .	.10 " 25.00	H.	Geomyricite,		
549.	Fluor-apatite, v., . .	.15 " 4.00	688.	Gerhardtite,		
175.	Fluorite, . . . . .	.10 " 25.00	90.	Gersdorffite,	1.00 " 5.00	
175.	Fluor Spar, s., . . .	.10 " 25.00	97.	Geyerite, v.,		
195.	Fluosiderite, r., . .		212.	Geyserite, v., . . . .	.40 " 2.00	
106.	Foliated Tellurium,		264.	Gibbsite, . . . . .	.40 " 2.50	
	s.,	1.25 " 5.00	458.	Gieseckite, r., . . .	.30 " 5.00	
270.	Fontainebleau		458.	Gigantolite, r., . . .		
	Limestone, v., . . .	.20 " 4.00	458.	Gilbertite, v., . . . .	.40 " 1.50	
N.	Footite,		506.	Gillingite, r., . . . .	.75 " 2.50	
625.	Forbesite,	1.00 " 4.00	H.	Gilsonite, s., Uin-		
509.	Forchhammerite,			tahite, . . . . .	.10 " .40	
	ap.,		509.	Ginilsite, ap.,		
212.	Forcherite, v., . . .	.50 " 2.50	212.	Girasol, v., . . . . .	.25 " 1.00	
443.	Foresite, r., . . . .	.75 " 2.50	444.	Gismondite, . . . . .	.75 " 4.00	
375.	Forsterite, . . . . .	.30 " 1.50	399.	Glancespar, r., . . .		
210.	Fortification Agate,		505.	Glaurite, r.,		
	v., . . . . .	.40 " 3.00	718.	Glauberite, . . . . .	.25 " 3.00	
N.	Fouquéite,		743.	Glauber Salt, s., . .	.50 " 2.00	
335.	Fowlerite, v., . . . .	.30 " 5.00	N.	Glaucocroite,	2.00 " 9.00	
549.	Francolite, v., . . .	.40 " 3.00	101.	Glaucodot, . . . . .	.75 " 2.50	
N.	Francite,		387.	Glaucolite, v., . . .	.75 " 3.00	
708.	Franklandite, r., . .		490.	Glaucosite, . . . . .	.10 " .40	
239.	Franklinite, . . . . .	.20 " 3.00	339.	Glaucophane, . . . .	.30 " 1.50	
149.	Fredricite, v., . . .		97.	Glaucopyrite, s., . .	.20 " .75	
148.	Freibergite, s., . . .	2.00 " 3.00	H.	Glessite,		
135.	Freieslebenite, . . .	2.00 " 9.00	376.	Glinkite, v.,		
484.	French Chalk, v., . .	.10 " .40	648.	Globosite, r.,		
395.	Freyalite, r.,		792.	Glockerite,		
384.	Friedelite,	1.25 " 5.00	452.	Glottalite, r.,		
56.	Frieseite, v.,		448.	Gmelinite, . . . . .	.75 " 4.00	
665.	Fritzscheite, r., . .		13.	Gold, . . . . .	.20 " 15.00	
458.	Fuchsite, v., . . . .	.30 " 1.25	13.	Gold Amalgam, r., . .		
N.	Fuggerite, . . . . .	.50 " 2.00	344.	Golden Beryl, v., . .	.75 " 5.00	
500.	Fuller's Earth, ap., .	.10 " .40	N.	Goldschmidtite, . . .		
325.	Funkite, v.,		N.	Gonnardite,		
			344.	Goshenite, v.,		
389.	Gabronite, r.,		749.	Goslarite, . . . . .	.40 " 1.50	
404.	Gadolinite,	1.00 " 15.00	257.	Göthite, . . . . .	.25 " 1.50	
236.	Gahnite, . . . . .	.50 " 7.00	657.	Goyazite,		
455.	Galactite, v.,		H.	Grahamite, . . . . .	.30 " 2.00	
45.	Galena, . . . . .	.25 " 2.00	505.	Graminite, v.,		
45.	Galenite, s., . . . . .	.25 " 2.00	211.	Granuline, r., . . . .	.40 " 1.50	
118.	Galenobismutite, . .	1.50 " 6.00	104.	Graphic Tellurium		
338.	Gamsigradite, v., . .			s.,	1.00 " 7.00	
355.	Ganomalite, . . . . .	.40 " 2.00	2.	Graphite, . . . . .	.15 " .75	
432.	Ganophyllite,		N.	Graphitite,		
370.	Garnet, . . . . .	.20 " 5.00	2.	Graphitoid, r.,		
483A.	Garnierite, . . . . .	.30 " 1.50	479.	Grastite, r.,		
297.	Gay-lussite, . . . . .	.50 " 3.00	148.	Gray Copper Ore, s., .	.20 " 3.00	
207.	Gearksutite, . . . . .	.40 " 2.00	68.	Greenockite, . . . . .	.75 " 4.00	
H.	Gedanite,		212.	Green-opal, v., . . . .	.25 " 3.00	
337A.	Gedrite,		510.	Greenovite, v., . . . .	.75 " 2.50	
392.	Gehlenite, . . . . .	.25 " 1.50	555.	Griphite, r., . . . . .	.25 " 1.50	
N.	Geikielite,	1.00 " 4.00	469.	Grochauite, r.,		
483.	Genthite, . . . . .	.20 " 1.50	448.	Groddeckite, r., . . .		

509.	Groppite, ap., . . . \$	\$	706.	Heintzite, \$	\$
370.	Grossularite, v., . . .	.25 to 3.00	H.	Helenite,	
510.	Grothite, v., . . .		210.	Heliotrope, v., . . .	.25 to 1.00
75.	Grünauite, r., . . .		462B.	Helvetan, r., . . .	
338.	Grünerite, v., . . .		366.	Helvite, . . . . .	.75 " 4.00
N.	Grünlingite, . . .		627.	Hemafibrite, . . .	
59.	Guadalcazarite, r., . .		232.	Hematite, . . . . .	.10 " 20.00
30.	Guanajuatite, . . .	1.00 " 4.00	581.	Hematolite, . . .	
585.	Guanapite, r., . . .		46.	Henryite, r., . . .	
549.	Guano, r., . . . . .	.10 " .40	655.	Henwoodite, r., . .	.75 " 2.50
742.	Guanovulite, r., . .		66.	Hepatic Cinna-	
585.	Guanoxalate, r., . .		bar, v., . . . . .	.50 " 2.00	
512.	Guarinite, . . . . .	.75 " 3.00	235.	Hercynite, . . . . .	.25 " 1.00
110.	Guejarite,		547.	Herderite,	1.50 " 7.00
142.	Guitermanite, . . .	.40 " 1.50	526A.	Hermannolite, r.	
497.	Gümbelite, r., . . .		780.	Herrengrundite, . .	.50 " 2.00
712.	Gummite, . . . . .	.50 " 2.00	275.	Herrerite, v., . . .	
N.	Gunnarite,		447.	Herschelite, v., . .	.50 " 4.00
175.	Gunnisonite, r., . .		N.	Hessenbergite, . . .	
H.	Guyaquillite, . . .		43.	Hessite,	2.00 " 15.00
482.	Gymnite, s., . . . .	.20 " 1.00	269.	Heterolite, ap., . .	.25 " 1.00
746.	Gypsum, . . . . .	.10 " 12.00	269.	Heterogenite, ap.,	
434.	Gyrolite,		130.	Heteromorphite, v.,	.30 " 2.00
206.	Hagemannite, r., . .	.20 " .75	544.	Heterosite, r., . . .	.40 " 1.50
616.	Haidingerite, . . .		269.	Heubachite, ap., .	
N.	Hainite,		438.	Heulandite, . . . .	.30 " 4.00
166.	Halite, . . . . .	.10 " 1.50	338.	Hexagonite, v., . .	.10 " .75
480.	Hallite, r., . . . . .	.20 " .75	302.	Hibbertite, r., . . .	
493.	Halloysite, . . . . .	.30 " 1.25	327.	Hiddenite, v., . . .	.75 " 4.00
769.	Halotrichite, . . . .	.25 " 1.00	531.	Hielmite, . . . . .	.50 " 2.00
696.	Hambergite,		185.	Hieratite,	
548.	Hamlinite,		338.	Hillängsite, v., . .	.75 " 3.00
N.	Hancockite, . . . .	.20 " 3.00	706.	Hintzeite, s., . . .	
733.	Hanksite, . . . . .	.25 " 2.00	334.	Hiortdahlite, . . .	.75 " 4.00
623.	Hannayite,		H.	Hircite,	
N.	Hardystonite, . . .	.20 " 2.00	506.	Hisingerite, . . . .	.40 " 1.50
442.	Harmotome, . . . . .	.50 " 3.00	270.	Hislopite, v., . . .	
455.	Harringtonite, v., . .		N.	Hoefelite,	
54.	Harrisite, r., . . .		600.	Hernesite,	
412.	Harstigit,		H.	Hofmannite,	
H.	Hartite, . . . . .	.25 " 1.00	787.	Hohmannite, r., . .	.75 " 2.50
N.	Hastingsite,		83.	Homichlin, r., . . .	
H.	Hatchettite, . . . .	.25 " 2.00	402.	Homilite, . . . . .	.75 " 3.00
521.	Hatchettolite, . . .		587.	Hopeite,	
N.	Hauchecornite, . . .		74.	Horbachite, r., . . .	
86.	Hauerite, . . . . .	.75 " 5.00	338.	Hornblende, v., . .	.10 " 5.00
462.	Haughtonite, v., . .		210.	Hornblende in	
243.	Hausmannite, . . .	.20 " 4.00	Quartz, v., . . . .	.30 " 1.50	
N.	Hautefeuilleite . . .		169.	Hornsilver, s., . . .	.40 " 6.00
363.	Haüynite, . . . . .	.30 " 5.00	210.	Horn Stone	
447.	Haydenite, v., . . .	.30 " 2.00	(Chert), v., . . .	.10 " .40	
709.	Hayesine, r., . . .		36.	Horsfordite,	
210.	Haytorite, v., . . .		376.	Hortonolite, r., . .	
719.	Heavy Spar, s., . . .	.10 " 6.00	266.	Houghite, r., . . .	
N.	Heazlewoodite, . . .		293.	Hovite, r.,	
325.	Hectorite, r., . . .		701.	Howlite, . . . . .	.40 " 1.50
325.	Hedenbergite, v., . .	.30 " 5.00	166.	Huantajayite, r., .	1.50 " 5.00
552.	Hediphyane, r., . . .	.75 " 4.00	45.	Huascalite, r., . . .	
			813.	Hübnerite, . . . . .	.50 " 2.00

325.	Hudsonite, v., . . . \$	\$	223.	Ice,	\$	\$
479.	Hullite, r.,		270.	Iceland Spar, v., .	.30 to	4.00
823.	Humboldtine, . . .	1.00 to 4.00	393.	Idocrase, s., . . .	.20 "	2.50
H.	Huminite,		H.	Idrialite,		
414.	Humite,	1.00 " 5.00	N.	Idrizite,		
H.	Humus acid,		267.	Igelströmite, s., .	.50 "	3.00
35.	Huntillite, r., . . .	.75 " 3.00	378.	Igelströmite, v., .	.75 "	3.00
624.	Hureaulite,		802.	Ignatievite, r., .		
320.	Huronite, r., . . .		774.	Ihlöite,		
500.	Hyerlera, ap., . . .		747.	Ilesite,		
394.	Hyacinth, v., . . .	.50 " 2.00	233.	Ilmenite, . . . . .	.10 "	1.25
212.	Hyalite, v., . . . .	.40 " 3.00	250.	Ilmenorutile, v., .		
314.	Hyalophane,		219.	Ilsemanite, r., .		
376.	Hyalosiderite, v., .		417.	Ilvaite, . . . . .	.75 "	4.00
356.	Hyalotekite,		320.	Indianite, v., . . .	.30 "	1.25
264.	Hydrargillite, s., .	.40 " 2.50	426.	Indicolite, v., . .	.20 "	10.00
269.	Hydrated Titanic Oxide, ap.,		431.	Inesite, . . . . .	.50 "	2.50
270.	Hydraulic Lime- stone, v., . . . .	.10 " .40	212.	Infusorial Earth, v.,	.10 "	.40
549.	Hydroapatite, . r.,	.25 " 2.00	172.	Iodobromite,		
462.	Hydrobiotite, r., .		173.	Iodyrite,	1.50 "	8.00
710.	Hydroboracite, . .		353.	Iolite, . . . . .	.10 "	3.00
N.	Hydrobucholzite, .		H.	Ionite,		
N.	Hydrocalcite, . . .		21.	Iridium,		
	Hydrocarbons. —		22.	Iridosmine, . . . .	.50 "	9.00
	Described at end of Dana classifi- cation.		241.	Irite, r.,		
310.	Hydrocastorite, r.,		25.	Iron, . . . . .	.20 "	25.00
292.	Hydrocerussite, . .	1.50 " 5.00	241.	" Chromic, s., . .	.10 "	.50
298.	Hydroconite, r., . .		237.	" Magnetic, s., . .	.10 "	4.00
224.	Hydrocuprite, r., .	.20 " 1.00	25.	" Meteoric, v., . .	.20 "	25.00
724.	Hydrocyanite, . . .		85.	" Pyrites, s., . . .	.10 "	3.00
302.	Hydrodolomite, r., .	.40 " 3.00	25.	" Terrestrial, v., .	.75 "	9.00
185.	Hydrofluorite, r., .		233.	" Titaniferous, s.,	.10 "	1.25
269.	Hydrofranklinite, ap.,		751.	" Vitriol, s., . . .	.30 "	1.25
301.	Hydrogiobertite, .		233.	Iserine, r., . . . .	.75 "	3.00
166.	Hydrohalite, r., . .		250.	Iserite, r.,		
233.	Hydroilmenite, r., .			Isinglass (Mica), .		
300.	Hydromagnesite, . .	.30 " 1.50	626.	Isoclasite,		
457.	Hydronephelite, . .	.40 " 1.50	210.	Itacolumyte, s. v.,	.10 "	.75
212.	Hydrophane, v., . .	.40 " 2.00	364.	Ittnerite, r., . . .		
174.	Hydrophilite, . . .		371.	Ivarrite, r.,		
481.	Hydrophite, r., . .	.50 " 2.50	458.	Ivigite, v., . . . .	.20 "	.75
269.	Hydroplumbite, ap.,		526A.	Ixiolite, r.,		
335.	Hydrorhodonite, r.,	.50 " 3.00	H.	Ixolyte,		
N.	Hydrosamarškite, .					
509.	Hydrosilicite, ap.		240.	Jacobsite, . . . . .	.40 "	2.00
468A.	Hydrotalc, v., . . .		328.	Jadeite, . . . . .	.75 "	4.00
266.	Hydrotalcite, . . .	.30 " 1.50	70.	Jaipurite, r., . . .		
379.	Hydrotephroite, r.,		42.	Jalpaite, r.,		
519.	Hydrotitanite, r., .	.10 " 1.00	130.	Jamesonite, . . . .	.30 "	4.00
291.	Hydrozincite, . . .	.30 " 1.50	394.	Jargon, v.,	1.00 "	4.00
458.	Hygrophilite, r., . .		801.	Jarosite, . . . . .	.40 "	2.00
324.	Hypersthene, . . .	.50 " 2.00	210.	Jasper, v., . . . .	.15 "	2.00
430.	Hypochlorite, ap., .		210.	Jasperized Wood,		
316.	Hyposclerite, v., . .		v., . . . . .	.15 "	12.00	
233.	Hystatite, v., . . .		212.	Jasp-opal, v., . . .	.20 "	.75
			H.	Jaulingite,		
			480.	Jefferisite, . . . .	.15 "	4.00
			325.	Jeffersonite, v., .	.10 "	5.00
			370.	Jelletite, v., . . .		

211.	Jenzschite, r., . . .	\$	\$	520A.	Koppite,	\$.25 to \$1.00
692.	Jeremejevite, . . .			774.	Kornelite, r., . . .	
H.	Jet, v. Coal, . . .	.20 to	.75	429.	Kornerupine, . . .	
607.	Jogynaite, r., . . .			468.	Kotschubeite, v., .	
806.	Johannite,			604.	Köttigite,	
45.	Johnstonite, v., . .			313.	Krablite, r., . . . .	.75 " 2.50
515.	Johnstrupite, . . .	.75	" 2.50	233.	Kragero Hematite, v.,	
506.	Jollyte, r.,			H.	Krantzite, . . . . .	.25 " 1.00
150.	Jordanite,	2.00	" 8.00	236.	Kreittonnite, v., . .	
32.	Josëite,			198.	Kremersite,	
N.	Josephinite, . . . .	.40	" 1.50	105.	Krennerite,	1.00 " 5.00
727.	Jossaite, r.,			74.	Kröberite, r.,	
				776.	Kröhnkite, . . . . .	.50 " 2.50
338.	Kaersutite,			762.	Krugite, r.,	
730.	Kainite, . . . . .	.10	" .40	429.	Kryptotil, r.,	
N.	Kalgoorlite,	2.00	" 8.00	N.	Ktypeite,	
705.	Kaliborite, r., . . .			504.	Kupferblau, r., . . .	
287.	Kalicine, r.,			337.	Kupfferite, v.,	
764.	Kalinite, . . . . .	.20	" 1.00	14.	Küstelite, v.,	
359.	Kaliophilite,			N.	Kylindrite, . . . . .	.50 " 2.50
360.	Kalk-cancrinite, r.,					
N.	Kallilite,			319.	Labradorite, . . . . .	.10 " 2.00
N.	Kamarezite,			702.	Lagonite,	
468A.	Kämmererite, v., . .	.30	" 1.50	269.	Lampadite, r.,	
108.	Kaneite, ap.,			805.	Lamprophanite, r., .	
492.	Kaolin, s., . . . . .	.10	" .40	N.	Lamprophyllite, . . .	
492.	Kaolinite, . . . . .	.10	" .40	N.	Lamprostibian,	
N.	Karamsinite,			737.	Lanarkite,	2.00 " 15.00
537.	Kärrarfeite, r., . . .			419.	Langbanite, . . . . .	.75 " 4.00
217.	Karelinite, r.,			N.	Langbeinite,	
500.	Keffekillite, ap., . .			779.	Langite, . . . . .	.50 " 3.00
N.	Kehoeite,			302.	Lansfordite,	
511.	Keilhauite, . . . . .	.30	" 2.00	298.	Lanthanite,	1.50 " 6.00
420.	Kentrolite, . . . . .	.75	" 3.00	365.	Lapis-Lazuli, s., . . .	.30 " 2.00
107.	Kermesite,	1.00	" 5.00	703.	Larderellite,	1.00 " 4.00
480.	Kerrite, r.,			549.	Lasurapatite, v., . .	
811.	Kerstenite, r.,			320.	Latrobeite, v.,	
233.	Kibdelophane, v., . .			446.	Laubanite,	
232.	Kidney Ore, v., . . .	.30	" 1.50	445.	Laumontite, . . . . .	.50 " 4.00
498.	Kieselaluminite, r., .			189.	Laurionite, . . . . .	.40 " 1.50
744.	Kieserite, . . . . .	.10	" .40	94.	Laurite,	
154.	Kilbrickenite,			N.	Lautarite,	
458.	Killinite, r.,			158.	Lautite, r.,	
338.	Kirwanite, r.,			596.	Lavendulan, r., . . .	.50 " 2.50
284.	Kischtimite, r., . . .			332.	Lavenite,	
553.	Kjerulfine, v., . . . .	.50	" 3.00	325.	Lavrovite, v.,	
124.	Klaprotholite,			178.	Lawrencite, . . . . .	.75 " 3.00
471.	Klementite, r., . . .	.50	" 2.00	N.	Lawsonite, . . . . .	.40 " 10.00
335.	Klipsteinite, r., . . .	.75	" 2.50	574.	Lazulite, . . . . .	.25 " 2.00
378.	Knebelite, . . . . .	.75	" 3.00	313.	Lazurfeldspar, v., . .	
N.	Knopite,	1.00	" 5.00	365.	Lazurite, . . . . .	.30 " 4.00
785.	Knoxvillite,			18.	Lead, . . . . .	.20 " 3.00
131.	Kobellite,			734.	Leadhillite, . . . . .	.75 " 5.00
523.	Kochelite, r.,			742.	Lecontite,	
H.	Köflachite,			510.	Lederite, v., . . . . .	.30 " 1.25
338.	Koksharovite, v., . .	.75	" 2.50	719.	Leedsite, r.,	
17.	Kongsbergite, v., . .			313.	Leelite, v., . . . . .	.50 " 2.00
614.	Koninckite, . . . . .	.50	" 2.50	50.	Lehrbachite,	
H.	Könlite,			509.	Leidyite, ap., . . . .	.25 " 1.00

N.	Lembergite, . . .	\$	\$	325.	Lotalite, v., . . .	\$	\$
480.	Lennilite, r., . . .	.25	to 1.50	435.	Louisite, r., . . .		
493.	Lenzinite, v., . . .			757.	Löweite,		
445.	Leonhardite, v., . . .	.50	" 2.50	802.	Löwigite,		
N.	Leonite,			313.	Loxoclase, v., . . .	.15	to 1.00
257.	Lepidokrokite, s., . . .	.25	" 1.50	480.	Lucasite, r.,		
460.	Lepidolite, . . . . .	.10	" 1.50	638.	Ludlamite, . . . . .	.75	" 4.00
462B.	Lepidomelane, . . .	.30	" 1.25	694.	Ludwigite, . . . . .	.40	" 1.50
458.	Lepidomorphite, v., . . .			270.	Lumachelle, v., . . .	.25	" 1.00
320.	Lepolite, v.,			682.	Lüneburgite,		
509.	Lesleyite, ap., . . .	.75	" 3.00	212.	Lussatite, r.,		
781.	Lettsomite, s., . . .	.75	" 3.00	158.	Luzonite, r.,		
325.	Leucaugite, v., . . .			210.	Lydian Stone, s. v., . . .	.15	" .50
468.	Leuchtenbergite, v., . . .	.50	" 2.00	458.	Lythrodites, r., . . .		
321.	Leucite, . . . . .	.30	" 2.50				
631.	Leucochalcite, . . .			35.	Macfarlanite, r., . . .		
435.	Leucocyclite, v., . . .			N.	Mackintoshite, . . .		
H.	Leucopetrite, . . .			480.	Maconite, r.,		
351.	Leucophanite, . . .	.40	" 1.50	270.	Madrepore Marble, v., . . . . .	.20	" .75
458.	Leucophyllite, v., . . .			271.	Magnesian Limestone, s., . . . .	.10	" .40
97.	Leucopyrite, v., . . .	.20	" .75	233.	Magnesian Menaccanite, v., . . .		
509.	Leucotile, ap., . . .			238.	Magnesioferrite, . . .		
492.	Leverrierite, r., . . .			272.	Magnesite, . . . . .	.10	" 1.00
59.	Levigianite, r., . . .			237.	Magnetic Iron Ore, s., . . . . .	.10	" 4.00
449.	Levynite,			20.	Magnetic Platinum, v.,		
N.	Lewisite,			74.	Magnetic Pyrites, s., . . . . .	.10	" 2.50
562.	Libethenite, . . . . .	.75	" 4.00	237.	Magnetite, . . . . .	.10	" 4.00
458.	Liebenerite, r., . . .	.20	" .75	241.	Magnochromite, v., . . .		
308.	Liebigite,			810.	Magnolite, r.,		
417.	Lievrite, s., . . . . .	.75	" 4.00	288.	Malachite, . . . . .	.20	" 6.00
H.	Lignite, . . . . .	.10	" .40	325.	Malaccolite, v., . . .	.10	" .50
510.	Ligurite, v.,			394.	Malacon, r., . . . . .	.10	" .50
140.	Lillianite,			752.	Mallardite,		
509.	Lillite, ap.,			762.	Mamanite, r.,		
481.	Limbachite, r., . . .			N.	Manganandalusite, . . .		
230.	Lime, r.,			549.	Manganapatite, v., . . .		
288.	Lime-malachite, r., . . .			N.	Manganberzeliite, . . .		
270.	Limestone, s. v., . . .	.10	" 1.00	262.	Manganbrucite, v., . . .		
639.	Lime-wavellite, r., . . .			325.	Manganhedenbergite, v.,		
259.	Limonite, . . . . .	.10	" .75	258.	Manganite, . . . . .	.20	" 2.50
260.	Limnite, r.,			237.	Manganmagnetite, v., . . .	.25	" 1.00
741.	Linarite, . . . . .	.75	" 6.00	270.	Manganocalcite, v., . . .		
681.	Lindackerite,			274.	Manganocalcite, v., . . .		
320.	Lindsayite, v.,			N.	Manganoferrite,		
79.	Linnæite, . . . . .	.50	" 3.00	462.	Manganophyllite, v., . . .	.40	" 2.00
654.	Liroconite,	1.00	" 8.00	226.	Manganosite,	1.00	" 4.00
644.	Liskeardite, . . . . .	.50	" 2.50	583.	Manganostibiite, . . .		
460.	Lithia Mica, s., . . .	.10	" 1.50	330.	Manganpectolite, v., . . . . .	.40	" 1.50
544.	Lithiophilite, . . . .	.15	" .75	270.	Marble, v., . . . . .	.20	" 1.00
269.	Lithiophorite, r., . . .	.40	" 1.50	96.	Marcasite, . . . . .	.20	" 2.50
270.	Lithographic stone, . . .	.10	" .40	335.	Marceline, r.,		
492.	Lithomarge, v., . . .	.25	" 1.00				
109.	Livingstonite, . . . .	.75	" 2.50				
237.	Lodestone, v., . . . .	.25	" 2.00				
338.	Loganite, r.,						
468A.	Loganite, v.,						
97.	Löllingite, . . . . .	.20	" .75				
N.	Lorandite,	1.00	" 6.00				
N.	Lossenite, . . . . .	.40	" 1.50				

230.	Marcylite, r., . . .	\$	\$	N.	Metadesmine, . . .	\$	\$
464.	Margarite, . . . .	.30	to 2.00	N.	Metanocerine, . .		
458.	Margarodite, v., .	.20	" .75	N.	Metascolecite, . .		
389.	Marialite,			458.	Metasericite, v., .		
338.	Marmairolite, v., .			28.	Metastibnite, r., .		
58.	Marmatite, v., . .	.30	" 2.00	797.	Metavoltine, . . .		
481.	Marmolite, v., . .	.15	" .75	481.	Metaxoite, r., . .		
N.	Marshite,			25.	Meteoric Iron, v., .	.20	to 25.00
620.	Martinite,			25.	Meteoric Stone, v.,	1.00	" 5.00
166.	Martinsite, r., . .			270.	Mexican Onyx, v., .	.30	" 1.50
232.	Martite, r., . . .	.25	" 1.50	220.	Meymacite, r., . .		
714.	Mascagnite, . . .	.50	" 2.00	121.	Miargyrite,	1.50	" 9.00
319.	Maskelynite, r., .			232.	Micaceous Iron Ore,		
466.	Masonite, v., . . .	.10	" .40	v., . . . . .	.10	" .50	
229.	Massicot,	1.00	" 5.00		Mica Group, 458-463,		
120.	Matildite,			212.	Michaelite, v., . .		
186.	Matlockite,	1.00	" 15.00	315.	Microcline, . . . .	.25	" 7.00
376.	Matricite, r., . . .			522.	Microcline, . . . .	.40	" 2.00
N.	Mauzeliite,			361.	Microsommitite, . .	1.50	" 6.00
651.	Mazapilite,	1.00	" 4.00	H.	Middletonite, . . .		
807.	Medjidite, r., . . .			N.	Miersite,		
492.	Meerschalmunite,			550.	Miesite, v.,		
r.,				320.	Mikrocin, r., . . .		
485.	Meerschaum, s., . .	.20	" 1.25	311.	Milarite,	1.25	" 5.00
386.	Meionite, . . . . .	.50	" 2.00	212.	Milk-opal, v., . . .	.25	" 1.00
230.	Melaconite, v., . .	.40	" 1.50	210.	Milky Quartz, v., .	.10	" 1.00
544.	Melanchlor, r., . .			70.	Millerite, . . . . .	.30	" 2.00
370.	Melanite, v., . . .	.25	" 3.00	500.	Miloschite, ap., . .		
348.	Melanocerite, . . .			551.	Mimetite, . . . . .	.50	" 3.00
479.	Melanolite, r., . .			H.	Mineral Coal, . . .	.10	" .40
211.	Melanophlogite, r.,	.30	" 2.00	N.	Minervite,		
506.	Melanosiderite, r.,	1.00	" 4.00	244.	Minium,	1.00	" 6.00
421.	Melanotekite, . . .	.40	" 2.00	743.	Mirabilite, . . . .	.50	" 2.00
193.	Melanothallite, r.,			682.	Miriquidite, ap., .		
751.	Melanterite, . . . .	.30	" 1.25	735.	Misenite,		
391.	Mellite, . . . . .	.40	" 1.50	98.	Mispickel, s., . . .	.10	" 1.50
500.	Melinite, ap., . . .			N.	Mitchellite,		
352.	Meliphanite, . . .	.75	" 3.00	668.	Mixite, . . . . .	.40	" 1.50
824.	Mellite, . . . . .	.50	" 2.00	388.	Mizzonite, . . . . .	.50	" 2.00
77.	Melonite,			210.	Mocha-Stone, s. v.,	.15	" 2.00
509.	Melopsite, ap., . .			34.	Molybdenite, . . . .	.20	" 10.00
233.	Menaccanite, s., . .	.10	" 1.25	219.	Molybdic Ocher, s.,	.40	" 1.50
187.	Mendipite, . . . . .	.75	" 4.00	219.	Molybdite, . . . . .	.40	" 1.50
766.	Mendozite,	1.00	" 4.00	811.	Molybdomenite, r.,		
151.	Meneghinite, . . .	.50	" 4.00	181.	Molysite,		
526A.	Mengite, r.,			537.	Monazite, . . . . .	.15	" 2.00
212.	Menilite, v., . . . .	.10	" .50	560.	Monetite, . . . . .	.25	" 1.00
58.	Mercurial Blende, v.,			539.	Monimolite,		
16.	Mercury, . . . . .	.50	" 2.00	325.	Monradite, r., . . .		
462.	Meroxene, v., . . .	.10	" 3.00	808.	Montanite,		
272A.	Mesitite, . . . . .	.50	" 2.00	374.	Monticellite, . . . .	.30	" 4.00
456.	Mesole, v., . . . . .	.25	" 1.00	496.	Montmorillonite, . .	.20	" .75
449.	Mesolin, r.,			430.	Monzonite, ap., . .		
455.	Mesolite, . . . . .	.40	" 1.50	315.	Moonstone, v., . . .	.20	" 1.50
453.	Mesotype, s., . . .	.30	" 2.00	316.	Moonstone, v., . . .	.20	" 1.50
593.	Messelite, . . . . .	.40	" 1.50	437.	Mordenite,		
619.	Metabrushite, . . .			750.	Morenosite,		
471.	Metachlorite, r., . .	.50	" 2.00	423.	Moresnetite, r., . .	.40	" 1.50
59.	Metacinnabarite, . .	.40	" 1.50	N.	Morinite,		

516.	Mosandrite, . . .	\$.50 to \$2.00			
210.	Moss-Agate, v., . .	.15	"	2.00	
	N. Mossite,				
277.	Mossottite, v., . .	.40	"	1.50	
567.	Mottramite, r., . .				
338.	Mountain Cork, v.,	.20	"	.75	
338.	Mountain Leather				
	v., . . . . .	.10	"	.50	
338.	Mountain Wood, v.,	.20	"	.75	
	H. Muckite,				
104.	Müllérine, r., . .				
585.	Müllerite, r., . . .				
	N. Munkforsite, . .				
313.	Murchisonite, v., .				
409.	Muromontite, r., .				
	N. Mursinskite, . . .				
458.	Muscovite, . . . .	.10	"	2.00	
325.	Mussite, v., . . . .	.20	"	.75	
288.	Mysorin, r.,				
672.	Nadorite, . . . . .	.50	"	3.00	
509.	Næsumite, ap., . .				
106.	Nagyagite,	1.25	"	5.00	
270.	Nail-head Spar, v.,	.30	"	1.50	
269.	Namaqualite, ap.,				
165.	Nantokite, . . . . .	.50	"	2.00	
	H. Napalite,				
	H. Naphtha,				
	H. Naphthalene, . .				
	N. Nasonite,	1.00	"	4.00	
	H. Native Humus Acid,				
453.	Natrolite, . . . . .	.30	"	2.00	
296.	Natron,				
346.	Natron-catapleiite,				
	v.,				
545.	Natrophilite, . . .				
560.	Natrophite, r., . .				
48.	Naumannite, . . . .	.40	"	1.50	
313.	Necronite, v., . . .				
453.	Needle Zeolite, s.,	.30	"	2.00	
509.	Nefedieffite, ap., .				
	H. Neft-gil,				
262.	Nemalite, v.,				
376.	Neochrysolite, r.,	1.25	"	5.00	
430.	Neociano, ap., . . .	1.00	"	4.00	
509.	Neolite, ap.,				
509.	Neotocite,				
149.	Nepaulite, r., . . .				
357.	Nephelite, . . . . .	.15	"	3.00	
338.	Nephrite, v., . . . .	.20	"	.75	
	N. Neptunite,	1.00	"	4.00	
295.	Nesquehonite, . . .	.75	"	3.00	
	H. Neudorfite, . . .				
497.	Neurolite, r., . . .				
22.	Nevyanskite, v., . .				
621.	Newberyite, . . . .	.25	"	2.00	
494.	Newtonite,				
98.	Niccoliferous Arsenopyrite, v., .				
25.	Niccoliferous Iron, \$			\$	
	(Awaruite), v., . .				
74.	Niccoliferous Pyrite, s., . . . . .	.10 to		2.50	
71.	Niccolite, . . . . .	.40	"	3.00	
	N. Nickel,				
602.	Nickel Bloom, s., . .	.35	"	1.50	
90.	Nickel Glance, s.,	1.00	"	5.00	
237.	Nickel Oxide, r., . .				
	N. Nickel-skutterudite,				
509.	Nigrescite, ap., . .				
250.	Nigrine, v., . . . .	.15	"	.75	
684.	Niter,				
687.	Nitrobarite,				
685.	Nitrocalcite,				
690.	Nitroglauberite, . .				
686.	Nitromagnesite, . .				
711.	Nivenite, v.,				
195.	Nocerite, . . . . .	.30	"	1.50	
529.	Nohlite, r.,				
	H. Non-caking Coal,	.10	"	.40	
505.	Nontronite, v., . . .				
338.	Noralite, v.,				
691.	Nordenskiöldine, . .				
338.	Nordenskiöldite, v.,				
428.	Nordmarkite, v., . .				
	N. Northupite, . . . .	.20	"	1.50	
364.	Nosean, s., . . . . .	.40	"	1.50	
364.	Noselite, . . . . .	.40	"	1.50	
483A.	Noumeite, s., . . . .	.30	"	1.50	
550.	Nussierite, v., . . .				
387.	Nuttallite, v., . . . .	.25	"	1.00	
500.	Ochran, ap.,				
674.	Ochrolite,				
252.	Octahedrite, . . . .	.50	"	2.50	
458.	Oellacherite, v., . .	.50	"	2.00	
394.	Oerstedite, r., . . .				
	N. Offrétite, . . . . .	.30	"	1.50	
433.	Okenite, . . . . .	.40	"	1.50	
316.	Olafite, v., . . . . .	.75	"	2.50	
64.	Oldhamite,				
317.	Oligoclase, . . . . .	.15	"	3.00	
273.	Oligonite, v.,				
561.	Olivenite, . . . . .	.50	"	3.00	
376.	Olivine, v., . . . . .	.10	"	.50	
325.	Omphacite, v., . . .	.20	"	1.00	
458.	Oncophyllite, v., . .				
458.	Oncosine, v.,				
210.	Onegite, s. v., . . .	.75	"	3.00	
61.	Onofrite,				
811.	Onofrite, r.,				
387.	Ontariolite, v., . . .				
210.	Onyx, v., . . . . .	.40	"	1.50	
270.	Onyx, Mexican, v.,	.30	"	2.00	
270.	Oölite, v., . . . . .	.10	"	.50	
458.	Oosite, r.,				
212.	Opal, . . . . .	.50	"	20.00	
212.	Opal-agate, v., . . .	.30	"	1.50	

212.	Opalized Wood, v., \$	.20 to \$12.00	271.	Pearl Spar, v., . . . \$	.15 to \$2.00
395.	Orangite, v., . . .	1.00 " 4.00	324.	Peckhamite, r., .	
500.	Oravitzite, ap., . .		330.	Pectolite, . . . .	.20 " 1.50
37.	Orileyite, r., . . .		641.	Peganite,	
619.	Ornithite, v., . . .		269.	Pelagite, ap., . .	
27.	Orpiment, . . . .	.15 " 2.00	N.	Pelagosite,	
409.	Orthite, s., . . . .	.20 " 1.00	509.	Pelhamine, ap., .	
313.	Orthoclase, . . . .	.10 " 3.00	480.	Pelhamite, v., . .	
438.	Oryzite, r.,		270.	Pencatite, r., . . .	
64.	Osbornite, r., . . .		N.	Penfieldite,	
330.	Osmelite, v.,		468A.	Penninite, . . . .	.50 " 2.00
22.	Osmiridium, s., . .	.50 " 9.00	65.	Pentlandite,	
549.	Osteolite, v., . . .		509.	Penwithite, r., .	
467.	Ottrelite, . . . . .	.20 " .75	192.	Percylite,	1.25 " 5.00
370.	Ouvarovite, s. v., .	.75 " 3.00	225.	Periclase, . . . . .	.50 " 2.00
823.	Oxalate of So-		316.	Pericline, v., . . .	.40 " 1.50
	dium and Am-		376.	Peridot, s., . . . .	.10 " .50
	monium, r., . . .		316.	Peristerite, v., . .	.40 " 1.50
585.	Oxammite, r., . . .		518.	Perovskite, . . . .	.40 " 3.00
822.	Oxammite,		509.	Persbergite, ap., .	.75 " 3.00
435.	Oxhaverite, v., . .		313.	Perthite, r., . . . .	.20 " 1.50
456.	Ozarkite, v., . . . .	.10 " 1.00	310.	Petalite, . . . . .	.25 " 1.00
H.	Ozocerite, . . . . .	.10 " .50	212.	Petrified Wood, v.,	
			210.	(Opalized and	
205.	Pachnolite, . . . .	.20 " 1.25		Jasperized), . . .	.15 " 12.00
97.	Pacite, r.,		H.	Petrolene,	
480.	Painterite, r., . . .		H.	Petroleum, . . . . .	.10 " .40
335.	Paisbergite, v., . .	.30 " 5.00	796.	Pettkoite, r., . . .	
338.	Paligorskite, r., . .		44.	Petzite,	1.00 " 4.00
230.	Palladinite, r., . . .		338.	Phaactinite, r., .	
23.	Palladium,		447.	Phacolite, v., . . .	.50 " 4.00
13.	Palladium Gold, v.,		617.	Pharmacolite, . . .	.75 " 3.00
704.	Pandermite, r., . . .	.25 " 1.00	646.	Pharmacosiderite, .	.75 " 2.50
270.	Papierspath, . . . .	.50 " 2.00	324.	Phästine, r.,	
787.	Paposite, r.,		382.	Phenacite, . . . . .	.50 " 6.00
233.	Paracolumbite, v., .	.10 " .40	480.	Philadelphite, r., .	
313.	Paradoxite, v., . . .		776.	Phillipite, r., . . .	
H.	Paraffin,		441.	Phillipsite, . . . . .	.50 " 3.00
459.	Paragonite, . . . .	.25 " 1.00	462A.	Phlogopite, . . . .	.10 " 1.00
N.	Paralaurionite, . . .		726.	Phœnicochroite, .	
389.	Paralogite, r., . . .		491.	Pholidolite,	
794.	Paraluminite, . . .		286.	Phosgenite, . . . .	.75 " 5.00
N.	Paramelaconite, . .		585.	Phosphammite, r.,	
271A.	Parankerite, s., . .	.40 " 2.50	549.	Phosphatic Nodules,	
N.	Parathorite,			r., . . . . .	.10 " .40
338.	Pargasite, v., . . . .	.10 " 5.00	549.	Phosphorite, v., .	.10 " .40
284.	Parisite,	2.00 " 10.00	609.	Phosphosiderite, .	
N.	Paroligoclase, . . .		664.	Phosphuranylite, .	
458.	Parophite, r.,		335.	Photcite, r., . . . .	.20 " .75
372.	Partschinite,		467.	Phyllite, v., . . . .	.15 " .50
222.	Partzite, r., . . . .	.25 " 1.00	H.	Phylloretin,	
387.	Passauite, v.,		397.	Physalite, v.,	
211.	Passyite, r.,		H.	Phytocollite,	
789.	Pastreite, r.,		H.	Piauzite,	
819.	Pateraite, r., . . .		648.	Picite, r.,	
479.	Pattersonite, r., . .		768.	Pickeringite, . . . .	.25 " 1.00
H.	Peacock Coal, v., .	.10 " .40	234.	Picotite, v.,	
N.	Pearceite,		768.	Picroallumogene, r.,	.30 " 1.25
212.	Pearl Sinter, v., . .		407.	Picroepidote, r., .	

509.	Picrofluite, ap., . . .	\$	\$	75.	Polydymite, . . .	\$	\$
481.	Picrolite, v., . . .	.20 to	.75	762.	Polyhalite, . . .	.15 to	.50
760.	Picromerite, . . .			509.	Polyhydrite, ap.,		
595.	Picropharmacolite,			N.	Polylite, . . .		
325.	Picrophyll, r., . . .			461.	Polyolithionite, v.,		
509.	Picrosmine, ap., . .	.25	" 1.50	533.	Polymignite, . . .		
456.	Picrothomsonite r.,			550.	Polysphærite, . v.,		
337.	Piddingtonite, r.,			149.	Polytelite, r., . . .		
408.	Piedmontite, . . .	.30	" 1.50	481.	Porcellophite, . v.,	.20	" .75
824.	Pigotite, r., . . .	.75	" 3.00	13.	Porpezite, v., . . .		
509.	Pihlite, ap., . . .	.75	" 2.50	500.	Portite, ap., . . .		
504.	Pilarite, v., . . .			H.	Posepnyte, . . .		
509.	Pilinite, ap., . . .	.50	" 2.00	764.	Potash Alum, s., .	.20	" 1.00
509.	Pilolite, ap., . . .			458.	Potash Mica, s., .	.10	" 2.00
483A.	Pimelite, r., . . .			484.	Potstone, v., . . .	.10	" .40
695.	Pinakioilite, . . .	.40	" 3.00	816.	Powellite, . . .		
505.	Pinguite, v., . . .			210.	Prase, v., . . .	.30	" 1.25
458.	Pinitoid, r., . . .	.25	" 1.00	479.	Prasilite, r., . . .		
705.	Pinnoite, . . .			212.	Precious Opal, v.,	.50	" 20.00
N.	Pirssonite, . . .	.75	" 4.00	270.	Predazzite, r., . .	.30	" 1.50
753.	Pisanite, . . .	.40	" 1.50	411.	Prehnite, . . .	.20	" 3.00
270.	Pisolite, v., . . .	.25	" 1.00	411.	Prehnitoid, r., . .		
794.	Pissophanite, r., .			388.	Prehnitoid v., . .		
272A.	Pistomesite, v., . .	.25	" 2.00	58.	Pribramite, v., . .		
711.	Pitchblende, s., . .	.50	" 6.00	704.	Priceite, r., . . .	.25	" 1.00
325.	Pitkärantite, r., .			429.	Prismatine, r., . .		
H.	Pittasphalt, . . .			469.	Prochlorite, . . .	.10	" 1.00
678.	Pitticite, . . .	.75	" 3.00	185.	Proidonite, r., . .		
801.	Plagiocitrite, r., .			N.	Prolectite, . . .		
122.	Plagionite, . . .	1.00	" 5.00	204.	Prosopite, . . .		
108.	Plakodin, ap., . . .			325.	Protheite, v., . . .	.75	" 3.00
611.	Planerite, r., . . .			461.	Protolithionite, r.,		
N.	Planoferrite, . . .			505.	Protonontronite, r.,		
210.	Plasma, v., . . .	.20	" .75	480.	Protovermiculite, r.	.20	" .75
20.	Platinum, . . .	.50	" 9.00	145.	Proustite, . . .	.50	" 8.00
251.	Plattnerite, . . .	1.50	" 7.00	549.	Pseudoapatite, v.,		
120.	Plenargyrite, r., . .			538.	Pseudoberzelite, r.,		
234.	Pleonaste, s. v., . .	.30	" 1.25	462.	Pseudobiotite, r.,		
552.	Pleonectite, r., . . .	.75	" 3.00	246.	Pseudobrookite, .	.50	" 2.00
582.	Pleurasite, r., . . .			180.	Pseudocotunnite, r.,		
500.	Plinthite, ap., . . .			570.	Pseudomalachite, .	.50	" 2.50
435.	Plombierite, r., . .			437.	Pseudonatrolite, .		
2.	Plumbago, s., . . .	.15	" .75	195.	Pseudonocerina, r.		
498.	Plumballophane, r.,			468A.	Pseudophite, v., .		
229.	Plumbic Ocher, s., .	1.00	" 5.00	N.	Pseudopyrophyllite,		
270.	Plumbocalcite, v., .	.50	" 2.00	389.	Pseudo-Scapolite, r.,		
241.	Plumboferrite, r., .			344.	Pseudosmaragd, r.,		
658.	Plumbogummite, . .	2.00	" 15.00	543.	Pseudotriplite, r.,	.75	" 2.50
108.	Plumbomanganite,			269.	Psilomelane, . . .	.10	" 1.00
	ap., . . .			567.	Psittacinite, . . .		
108.	Plumbostannite, ap.,			342.	Pterolite, r., . . .		
249.	Polianite, . . .	.30	" 1.50	462B.	Pterolite, r., . . .		
322.	Pollucite, . . .	.50	" 2.00	436.	Ptilolite, . . .	.75	" 2.50
370.	Polyadelphite, v., .	.30	" 2.00	542.	Pucherite, . . .	1.00	" 5.00
458.	Polyargite, r., . . .			270.	Pudding-stone, v.,		
157.	Polyargyrite, . . .				(also v. of 210),	.10	" 1.25
557.	Polyarsenite, v., . .	.75	" 3.00	78.	Purple Copper Ore,		
156.	Polybasite, . . .	1.00	" 6.00	s., . . .		.30	" 5.00
535.	Polyerase, . . .	1.00	" 5.00	397.	Pycnite, v., . . .	.30	" 1.50

458.	Pycnophillite, v., . \$	\$	462.	Rastolyte, r., . . . \$	\$
509.	Pyknotrop, ap., .		N.	Rathite,	
325.	Pyrallolite, r., . .		496.	Razoumovskyn, r., .	.40 to 1.50
484.	Pyrallolite, v., . .		26.	Realgar, . . . . .	.50 " 3.00
144.	Pyrrargyrite, . . . .	.50 to 6.00	492.	Rectorite, r., . . .	.30 " 1.25
85.	Pyrite, . . . . .	.10 " 3.00	594.	Reddingite,	
98.	Pyrites, Arsenical,		785.	Redingtonite, r., .	
	s., . . . . .	.10 " 1.50	232.	Red Iron Ore, s., .	.10 " .40
96.	Pyrites, Cocks-		232.	" Ocher, v., . . .	.10 " .40
	comb, s., . . . .	.20 " 2.50	585.	Redondite, r., . .	
83.	Pyrites, Copper, s.,	.20 " 3.00	212.	Red-opal, v., . . .	.25 " 1.00
85.	" Iron, s., . . .	.10 " 3.00	54.	Redruthite, s., . .	.50 " 6.00
74.	" Magnetic, s., .	.10 " 2.50	483A.	Refdanskite, r., .	
96.	" Radiated, v., .	.20 " 1.50	H.	Refikite,	
84.	" Tin, s., . . .	.30 " 2.00	162.	Regnolite, r., . .	
267.	Pyroaurite, . . . .	.50 " 3.00	270.	Reichite, v., . . .	
520.	Pyrochlore, . . . .	.50 " 2.50	819.	Reinite,	
263.	Pyrochroite, . . . .	.50 " 2.50	304.	Remingtonite, . .	.75 " 3.00
509.	Pyroïdesine, ap., .		484.	Rensselaerite, v.,	.10 " .40
254.	Pyrolusite, . . . .	.10 " 3.00	212.	Resin-opal, v., . .	.25 " 1.00
510.	Pyromelane, r., . .		509.	Restormelite, ap.,	
550.	Pyromorphite, . . .	.20 " 5.00	481.	Retinalite, v., . .	
370.	Pyrope, v., . . . .	.20 " 2.00	H.	Retinellite,	
N.	Pyrophanite, . . .		H.	Retinite (Amber-	
586.	Pyrophosphorite, r.,			like resins), . . .	.20 " 3.00
497.	Pyrophyllite, . . . .	.25 " 3.00	N.	Retzian,	
H.	Pyropissite, . . . .	.10 " .50	H.	Reussinite,	
H.	Pyroretinite, . . .		113.	Rezbanyite,	
409.	Pyrothite, v., . . .		25.	Rhabdite, r., . . .	
480.	Pyrosclerite, r., . .		605.	Rhabdophanite, . .	
385.	Pyrosmalite,	1.00 to 4.00	667.	Rhagite,	
146.	Pyrostilpnite, . . .	1.50 " 5.00	500.	Rhodalite, ap., . .	
325.	Pyroxene, . . . . .	.10 " 7.00	13.	Rhodite, v.,	
522.	Pyrrhite, r.,		699.	Rhodizite,	
74.	Pyrrhotite, . . . . .	.10 " 2.50	468A.	Rhodochrome, v.,	.30 " 1.25
			274.	Rhodochrosite, . .	.15 " 15.00
210.	Quartz, . . . . .	.10 " 25.00	N.	Rhodolite, . . . . .	.50 " 3.00
N.	Quartzine, . . . . .	.40 " 1.50	335.	Rhodonite, . . . . .	.15 " 5.00
773.	Quenstedtite, . . .		210.	Riband Jasper, v.,	.15 " 2.00
804.	Quetenite,		653.	Richellite, r., . . .	.75 " 3.00
16.	Quicksilver, s., . .	.50 " 2.00	155.	Richmondite, r., .	
509.	Quincite, ap., . . .		264.	" r.,	
			338.	Richterite, v., . . .	.50 " 2.50
269.	Rabdionite, ap., . .		340.	Riebeckite,	
461.	Rabenglimmer, v., .	.40 " 2.00	517.	Rinkite,	
96.	Radiated Pyrites,		149.	Rionite, v.,	
	v., . . . . .	.50 " 2.50	468.	Ripidolite, s., . . .	.20 " 2.00
210.	Radiated Quartz,		388.	Riponite, v.,	
	v., . . . . .	.30 " 1.25	147.	Rittingerite, . . .	
453.	Radiolite, v.,		222.	Rivotite, r.,	
786.	Raimondite,		H.	Rochlederite, . . .	
208.	Ralstonite, . . . . .	.75 " 3.00	210.	Rock Crystal, v., .	.20 " 25.00
100.	Rammelsbergite, . .	1.00 " 4.00	746.	Rock-gypsum, v., .	.10 " .40
430.	Ramosite, ap., . . .		270.	Rock-meal, v., . . .	.15 " .50
212.	Randannite, v., . .		270.	Rock-milk, s. v., .	.15 " .50
309.	Randite, r., . . . .	.30 " 1.25	166.	Rock Salt, s., . . .	.10 " 1.50
457.	Ranite, v.,		N.	Roebelingite,	1.00 " 4.00
338.	Raphilite, v.,		379A.	Roepperite, . . . .	.75 " 2.50
232.	Raphisiderite, r., .		535.	Rogersite, ap., . .	.40 " 1.50

671.	Römeite,	\$	\$	270.	Satin Spar, v., . . .	\$.25 to \$1.00
778.	Römerite, . . . . .	.50 to 2.00		746.	Satin Spar, v., . . .	.20 " 1.25
463.	Roscoelite,	1.00 " 7.00		406.	Saussurite, r., . . .	.15 " .75
480.	Roseite, r., . . . . .	.25 " 1.50		179.	Scacchite,	
590.	Roselite,	1.50 " 6.00		387.	Scapolite, s., . . . .	.15 " 4.00
331.	Rosenbuschite, . . .	.50 " 2.00		500.	Scarborite, r., . . .	
210.	Rose Quartz, v., . .	.15 " 12.00		129.	Schapbachite, . . .	
458.	Rosite, r.,			814.	Scheelite, . . . . .	.50 " 8.00
622.	Rösslerite, r., . . .			H.	Scheererite,	
344.	Rosterite, r., . . .			325.	Schefferite, v., . . .	.50 " 2.00
H.	Rosthornite,			324.	Schiller Spar, r., . .	
370.	Rothoffite, v., . . .	.50 " 2.00		125.	Schirmerite,	
483.	Röttisite, r., . . . .	.20 " .75		669.	Schneebergite, r., .	
N.	Rowlandite,			445.	Schneiderite, v., . .	
462.	Rubellan, r., . . . .	.25 " 1.00		719.	Schoarite, v.,	
426.	Rubellite, v., . . . .	.20 " 25.00		426.	Schorl, s., . . . . .	.20 " 3.00
509.	Rubisite, ap.,			371.	Schorlomite, . . . .	.25 " 1.00
783.	Rubrite, r.,			H.	Schraufite,	
231.	Ruby, v., . . . . .	.75 " 4.00		25.	Schreibersite, r., . .	2.00 " 25.00
234.	" Balas, s. v., . . .	.25 " 1.00		309.	Schröckingerite, r.,	
58.	" Blende, v., . . . .	.20 " 8.00		500.	Schröterite, . . . . .	.75 " 2.50
224.	" Copper, s., . . . .	.20 " 3.00		N.	Schulzenite,	
145.	" Silver s., 144,			2.	Schungite, r.,	
	145, . . . . .	.50 " 8.00		188.	Schwartzemberg-	
234.	" Spinel, v., . . . .	.25 " 1.00		ite,	1.00 " 5.00	
58.	" Zinc, s., . . . . .	.20 " 3.00		148.	Schwartzite, v., . . .	.75 " 2.50
270.	Ruin Marble, v., . .	.75 " 2.50		H.	Scleretinite,	
H.	Rumänite,			454.	Scolecite, . . . . .	.30 " 2.00
479.	Rumpfite,			607.	Scorodite, . . . . .	.40 " 2.50
523.	Rutherfordite, r., .			407.	Scorza, v.,	
250.	Rutilated Quartz, v.	.40 " 6.00		506.	Scotiolite, v., . . .	
250.	Rutile, . . . . .	.15 " 7.00		456.	Scoulerite, v., . . .	
				605.	Scovillite, s.,	
99.	Safflorite, . . . . .	.40 " 1.50		447.	Seebachite, v. s., . .	.50 " 4.00
168.	Sal-Ammoniac, . . .	.25 " 1.00		N.	Seelandite,	
325.	Salite, v., . . . . .	.20 " .75		309.	Selbite, r.,	
466.	Salmite, v.,			118.	Seleniferous Galen-	
166.	Salt, s., . . . . .	.10 " 1.50		obismutite, v., . . .	1.50 " 6.00	
684.	Saltpeter, s.,			746.	Selenite, v., . . . .	.10 " 12.00
N.	Salvadorite,			5.	Selenium,	
529.	Samaraskite,	1.00 " 4.00		218.	Selenolite, r., . . .	
498.	Samoite, r.,			4.	Selensulphur, . . . .	.50 " 4.00
149.	Sandbergerite, v., .	.75 " 3.00		6.	Selen-Tellurium, . .	
210.	Sandstone, v., . . . .	.10 " .40		177.	Sellaite,	
210.	" Flexible, v., . . .	.10 " .75		500.	Selwynite, ap., . . .	
N.	Sanguinite,			212.	Semi-Opal, v., . . .	.25 " 3.00
313.	Sanidine, v., . . . .	.25 " 1.00		133.	Semseyite,	
488.	Saponite, . . . . .	.10 " .50		N.	Senaite,	
231.	Sapphire, v., . . . .	.40 " 3.00		214.	Senarmontite, . . . .	.40 " 3.00
210.	Sapphire-Quartz, v.,	.30 " 1.50		485.	Sepiolite, . . . . .	.50 " 2.00
430.	Sapphirine, . . . . .	.50 " 2.00		458.	Sericite, v., . . . . .	.20 " .75
390.	Sarcolite, . . . . .	.50 " 2.00		481.	Serpentine, . . . . .	.10 " 2.00
555.	Sarcopsidite, r., . .			481.	" Marble, v., . . . .	.30 " 2.00
210.	Sard, v., . . . . .	.20 " .75		782.	Serpierite, . . . . .	.75 " 2.50
210.	Sardonyx, v., . . . .	.20 " .75		H.	Settling Stones	
557.	Sarkinite, . . . . .	.75 " 2.50		Resin,		
115.	Sartorite,			465.	Seybertite, . . . . .	.40 " 2.00
457.	Sasbachite, ap., . .			270.	Shell-Marble, v., . .	.25 " 1.00
265.	Sassolite,			273.	Siderite, . . . . .	.10 " 3.00

25.	Siderites (Meteorite), v.,	\$.20 to \$25.00	58.	Sphalerite, . . . . .	.10 "	8.00
273.	Siderodot, v., . . .		510.	Sphene, s., . . . . .	.30 "	4.00
25.	Siderolites, v., . . .	1.00 "	430.	Sphenoclase, ap., . .		
799.	Sideronatrite, . . .	.75 "	273.	Spherosiderite, v., . .	.20 "	2.00
462.	Siderophyllite, v., .	.30 "	500.	Sphragidite, ap., . .		
273.	Sideroplesite, v., . .		234.	Spinel, . . . . .	.25 "	4.00
N.	Siderotil,		510.	Spinthere, v., . . .		
H.	Siegburgite, . . . . .	.20 "	554.	Spodiosite,		
79.	Siegenite, v., . . . .	.50 "	327.	Spodumene, . . . . .	.15 "	1.00
270.	Siena Marble, v., . .	.20 "	549.	Staffelite, v., . . . .	.25 "	1.00
320.	Sigterite, r.,		270.	Stalactite, v., . . .	.20 "	3.00
30.	Silaonite r.,		270.	Stalagmite, v., . . .	.20 "	3.00
338.	Silfbergite, v., . . .		H.	Stanekite,		
210.	Siliceous Sinter, v., .		58.	Stanniferous		
210.	Silicified Wood, v., .			Blende, v.,		
	(also v., 212), . . . .	.15 "	84.	Stannite, . . . . .	.30 "	2.00
399.	Sillimanite, . . . . .	.15 "	462A.	Star Mica, s., . . . .	.10 "	1.00
14.	Silver, . . . . .	.30 "	210.	Star Quartz (Ast		
153.	" Brittle, s., . . . .	.75 "		eriated), v.,		
144.	" Dark Ruby,		231.	Star Sapphire, v., . .	.50 "	5.00
	s., . . . . .	.50 "	698.	Stassfurtite, s., . . .	.20 "	2.50
42.	" Glance, s., . . . .	.40 "	428.	Staurolite, . . . . .	.20 "	6.00
169.	" Horn, s., . . . . .	.40 "	479.	Steatargillite, r., . .		
145.	" Light Ruby,		484.	Steatite, s., . . . . .	.10 "	.40
	s., . . . . .	.50 "	437.	Steeleite, r.,	1.50 "	6.00
H.	Simetite, . . . . .	.50 "	349.	Steenstrupine, r., .	1.00 "	5.00
500.	Sinopite, ap.,		45.	Steinmannite, v., . .		
524.	Sipylite,	1.50 "	N.	Stellarite,		
22.	Siserskite, v.,		153.	Stephanite, . . . . .	.75 "	6.00
466.	Sismondine, v., . . .		615.	Stercorite,		
526A.	Skogbölite, . . . . .	.75 "	458.	Sterlingite, v., . . .		
95.	Skutterudite,	1.25 "	56.	Sternbergite,		
457.	Sloanite, ap.,		222.	Stetefeldtite, r., . .		
87.	Smaltite, . . . . .	.50 "	222.	Stibianite, r., . . .		
338.	Smaragdite, v., . . .	.30 "	583.	Stibiatil, r.,		
500.	Smectite, ap.,		222.	Stibiconite, . . . . .	.25 "	1.00
493.	Smectite, v.,		222.	Stibioferrite, r., . .		
275.	Smithsonite, . . . . .	.20 "	N.	Stibiotantalite, . . .	2.00 "	10.00
210.	Smoky Quartz, v., . .	.10 "	28.	Stibnite, . . . . .	.20 "	10.00
N.	Snarumite,		210.	Stibnite in Quartz,		
484.	Soapstone, s., . . . .	.10 "		v.,		
316.	Soda Feldspar, s., . .	.10 "	443.	Stilbite, . . . . .	.20 "	2.00
362.	Sodalite, . . . . .	.20 "	474.	Stilpnomelane, . . .	.30 "	1.25
683.	Soda Niter, . . . . .	.10 "	719.	Stinkstone, v., . . .	.20 "	.75
459.	Sodium Mica, s., . . .	.25 "	270.	Stinkstone, v., . . .		
90.	Sommarugaite, r., . .		496.	Stolpenite, v., . . .		
768.	Sonomaite, r.,		817.	Stolzite,	2.00 "	15.00
487.	Spadaite,		325.	Strakonitzite, r., . .		
441.	Spangite, r.,		335.	Stratopeite, r., . . .		
732.	Spangolite,		248.	Stream Tin, v., . . .	.25 "	1.00
273.	Spathic Iron, s., . . .	.10 "	608.	Strengite, . . . . .	.40 "	1.50
96.	Spear Pyrites, v., . .	.50 "	475.	Strigovite,		
232.	Specular Iron, s., . .	.10 "	389.	Stroganovite, r., . . .	.50 "	2.00
93.	Sperryllite,	1.00 "	55.	Stromeyerite,	2.00 "	8.00
370.	Spessartite, v., . . .	.50 "	280.	Strontianite, . . . . .	.10 "	1.00
643.	Sphærite,		270.	Strontianocalcite, v.,	.50 "	3.00
276.	Sphærocobaltite, . . .	1.00 "	585.	Struvite, . . . . .	.20 "	.75
443.	Sphærostilbite, v., \$	.30 to \$2.00	509.	Stübelite, ap., . . .		
			41.	Stützite,		

768.	Stüvenite, r., . . .	\$	\$	675.	Taznite, r., . . .	\$	\$
141.	Stylotypite, . . .			750.	Teetcite, r., . . .		
478.	Subdelessite, r., .			31.	Telluric Bismuth,		
H.	Succinellite, . . .			s., . . . . .		.50 to 2.50	
H.	Succinite, . . . . .	.50 to \$3.00		218.	Tellurite,		
498.	Sulfatellophan, r.,			7.	Tellurium, . . . . .	.40	3.00
N.	Sulfoborite,			305.	Tengerite,		
211.	Sulfuricin, r., . . .			149.	Tennantite, . . . . .	.50	3.00
728.	Sulphohalite, . . .			230.	Tenorite, . . . . .	.40	2.00
3.	Sulphur, . . . . .	.20	" 25.00	379.	Tephroite, . . . . .	.30	2.00
31.	Sulphurous Tetra-			381.	Tephrowillemite,		
	dymite, v., . . . . .	.50	" 2.00	v.,			
N.	Sundtite,			500.	Teratolite, ap., . . .		
	Sunstone, s. v. of			389.	Terenite, r.,		
	316 and 317, . . .	.75	" 2.50	25.	Terrestrial Iron,	1.50	" 12.00
734.	Susannite, r., . . .			287.	Teschemacherite,		
693.	Sussexite, . . . . .	.50	" 2.00	435.	Tesselite, v.,		
N.	Svabite, . . . . .	.50	" 3.00	31.	Tetradymite, . . . . .	.50	" 2.50
679.	Svanbergite,			N.	Tetragophosphite,		
N.	Sychnodymite, . . .			148.	Tetrahedrite, . . . .	.20	" 3.00
104.	Sylvanite, . . . . .	.50	" 7.00	337.	Thalackerite, v., . .		
167.	Sylvite, . . . . .	.15	" 1.25	N.	Thalénite,	1.50	" 6.00
598.	Symplesite, . . . . .	.75	" 3.00	502.	Thaumasite, . . . .	.10	" .50
579.	Synadelphite, . . .			716.	Thenardite, . . . . .	.20	" 3.00
756.	Syngenite, . . . . .	.75	" 4.00	294.	Thermonatrite, . . .		
338.	Syntagmatite, v.,			481.	Thermophyllite, v.,		
324.	Szaboite, v.,			821.	Thierschite, r., . . .		
697.	Szaibelyite, . . . .	.75	" 2.50	270.	Thinolite, r., . . . .	.20	" .75
745.	Szmikite,			273.	Thomäite, r.,		
				206.	Thomsenolite, . . . .	.40	" 3.00
212.	Tabasheer, r., . . .			456.	Thomsonite, . . . .	.30	" 4.00
468A.	Tabergite, r., . . .	.75	" 3.00	395.	Thorite, . . . . .	.50	" 6.00
210.	Tabular Quartz, v.,	.40	" 2.00	712.	Thorogummite, r., . .		
329.	" Spar, s., . . . .	.20	" 1.50	406.	Thulite, v., . . . . .	.20	" 1.00
202.	Tachhydrite, . . . .	.20	" .75	473.	Thuringite, . . . . .	.20	" .75
394.	Tachyaphaltite, r.,			60.	Tiemannite, . . . . .	.75	" 3.00
630.	Tagilite,			210.	Tiger-eye, v., . . . .	.15	" 3.00
484.	Talc, . . . . .	.10	" .40	N.	Tilasite,		
549.	Talc-apatite, r., . .			224.	Tile Ore, v.,		
479.	Talc-chlorite, r., . .			47.	Tilkerodite, r., . . .		
458.	Talcite, v.,			19.	Tin,		
484.	Talcoid, r.,			707.	Tincalconite, r., . .		
509.	Talcosite, ap., . . .			84.	Tin Pyrites, s., . . .	.30	" 2.00
555.	Talktriplite, v., . .			248.	Tin Stone, s., . . . .	.10	" 3.00
193.	Tallingite, r., . . .			233.	Titanic Iron, s., . . .	.10	" 1.25
767.	Tamarugite,			510.	Titanite, . . . . .	.30	" 4.00
320.	Tankite, v.,			376.	Titan-olivine, r., . .		
217.	Tantalie Ocher, r.,			510.	Titanomorphite, v.,		
526.	Tantalite,	1.00	" 6.00	248.	Toad's-Eye Tin, v.,	.40	" 1.50
143.	Tapalpite,			435.	Tobermorite, r., . . .		
527.	Tapiolite,			173.	Tocornalite, r., . . .		
645.	Taranakite, r., . . .			90.	Tombazite, r.,		
727.	Tarapacaité, r., . .			397.	Topaz, . . . . .	.15	" 10.00
45.	Targionite, v., . . .			370.	Topazolite, v., . . .	.50	" 2.50
277.	Tarnowitzite, v., . .	.75	" 2.50	H.	Torbanite, . . . . .	.20	" .75
H.	Tasmanite, . . . . .	.20	" .75	659.	Torbernite, . . . . .	.50	" 4.00
748.	Tauriscite, r., . . .			481.	Totaigite, r.,		
575.	Tavistockite,			210.	Touchstone, v., . . .	.15	" .50
N.	Taylorite,			426.	Tourmaline, . . . . .	.20	" 25.00

269.	Transvaalite, ap., \$	\$	480.	Vaalite, r.,	\$.40 to \$1.50
370.	Trautwinites, r., .		216.	Valentinite, . . . .	.40 " 1.50
325.	Traversellite, v., .	.20 to .75	N.	Valleite, . . . . .	.75 " 2.50
270.	Travertine, v., . .	.10 " .75	108.	Valeriite, ap., . .	.75 " 3.00
2.	Tremenheerite, r., .		217.	Vanadic Ocher, r., .	
338.	Tremolite, v., . . .	.20 " 1.00	552.	Vanadinite, . . . .	.30 " 5.00
596.	Trichalcite,		567.	Vanadiolite, r., . .	
211.	Tridymite, . . . . .	.40 " 2.00	463.	Vanadium Mica, s., .	1.00 " 7.00
380.	Trimerite,		423.	Vanuxemite, r., . .	.40 " 1.50
H.	Trinkerite,		78.	Variegated Copper	
543.	Triphylite, . . . . .	.30 " 2.00	Ore., s., . . . . .	.30 " 5.00	
555.	Triplite, . . . . .	.75 " 3.00	611.	Variscite, . . . . .	.25 " 3.00
556.	Triploidite, . . . .	.50 " 2.00	269.	Varvite, r.,	
212.	Tripoli Slate, v., . .		727.	Vauquelinite, . . .	1.50 " 5.00
212.	Tripolite, v., . . .	.10 " .40	467.	Venasquite, v., . .	
N.	Triphuyite,		509.	Venerite, ap., . . .	
350.	Tritomite,		481.	Verd-Antique, . v., .	.30 " 2.00
665.	Trögerite,		270.	Verd-antique Mar-	
73.	Troilite,	2.00 " 8.00	ble, v.,		
645.	Trolleite, r.,		480.	Vermiculite, r., . .	.20 " .75
299.	Trona, . . . . .	.25 " 1.00		Vermiculites, fol-	
381.	Troostite, v., . . . .	.50 " 4.00		lowing 480.	
513.	Tscheffkinite, . . . .	.75 " 2.50	211.	Vestan, r.,	
316.	Tschermakite, v., . .		393.	Vesuvianite, . . . .	.20 " 2.50
765.	Tschermigite, . . . .	.30 " 1.25	637.	Veszelyite,	
492.	Tuesite, v.,		323.	Victorite, v.,	
270.	Tufa, Calc v., . . . .	.10 " .50	529.	Vietinghofite, r., . .	
220.	Tungstite,		376.	Villarsite, r.,	
255.	Turgite, . . . . .	.20 " .75	325.	Violan, v., . . . . .	.30 " 1.25
642.	Turquoise, . . . . .	.30 " 2.00	479.	Viridite, r.,	
635.	Tyrolite, . . . . .	.40 " 1.50	755.	Vitriol, Blue, s., . .	.30 " 1.50
182.	Tysonite,	1.00 " 4.00	597.	Vivianite, . . . . .	.50 " 2.00
		!	807.	Voglianite, r.,	
233.	Uddevallite, v., . . .		309.	Voglite,	1.25 " 5.00
411.	Uigite, r.,		462.	Voigtite, r.,	
H.	Uintahite, . . . . .	.10 " .40	633.	Volborthite,	
708.	Ulexite, . . . . .	.15 " .75	222.	Volgerite, r.,	1.50 " 7.00
92.	Ullmannite, . . . . .	.75 " 5.00	796.	Voltaite,	
N.	Umangite,		108.	Voltzite,	
807.	Uraconite, r., . . . .	.40 " 3.00	723.	Vulpinite, v., . . .	
325.	Uralite, r.,				
338.	Uralite, v.,		269.	Wad, r., . . . . .	.10 " .75
409.	Uralorthite, v., . . .		423.	Wagite, v.,	
711.	Uraninite, . . . . .	.50 " 6.00	553.	Wagnerite, . . . . .	.50 " 3.00
711.	Urannibite, v.,		H.	Walchowite,	
807.	Uranochalcite, r., . .		338.	Waldheimite, r., . .	
663.	Uranocircite,		330.	Walkerite, v.,	
503.	Uranophane, . . . . .	.75 " 2.50	666.	Walpurkite, . . . . .	.50 " 2.50
807.	Uranopilite,		306.	Walthérite, r., . . .	
713.	Uranosphærite,		465A.	Walweite, v.,	
662.	Uranospinite,		622.	Wapplerite,	
307.	Uranothallite,		N.	Wardite, . . . . .	.75 " 3.00
395.	Uranothorite, v		740.	Waringtonite, v., . .	
503.	Uranotil, s., . . . . .	.75 " 2.50	126.	Warrenite,	
N.	Urbanite,		700.	Warwickite, . . . . .	.25 " 1.00
H.	Urpethite,		233.	Washingtonite, v., .	.20 " .75
786.	Utahite, . . . . .	.40 " 1.50	409.	Wasite, r.,	
N.	Utahlite,		223.	Water,	
370.	Uvarovite, v., . . . .	.75 " 3.00	763.	Wattevillite,	

639.	Wavellite,	\$.20 to \$3.00	428.	Xantholite, v., . . .	\$
N.	Webnerite,		465A.	Xanthophyllite, . .	
33.	Wehrlite,		409.	Xanthorthite, v., .	
285.	Weibyeite, r., . .		260.	Xanthosiderite, . .	.50 to 2.50
313.	Weissigite, v., . .		784.	Xanthosiderite, s.,	.30 " 2.00
N.	Wellsite,		399.	Xenolite, v., . . .	
387.	Wernerite, . . . .	.15 " 4.00	536.	Xenotime, . . . .	.50 " 4.00
791.	Werthemanite, r.,		N.	Xiphonite,	
399.	Westanite, r., . .		435.	Xonotlite, r., . .	
N.	Whartonite, . . .		435.	Xylochlore, v., . .	
H.	Wheelerite, . . .		H.	Xyloretinite, . . .	
136.	Wheel Ore, s., . .	.50 " 4.00	509.	Xylotile, ap., . .	
821.	Whewellite, . . .	2.00 " 9.00			
216.	White Antimony, s.,	.40 " 1.50	259.	Yellow Ocher, v., .	.10 " .40
213.	White Arsenic, s.,		108.	Youngite, ap., . .	
281.	White Lead Ore, s.,	.30 " 12.00	370.	Yttergarnet, v., .	
458.	White Mica, s., .	.10 " 2.00	405.	Yttrialite,	
96.	White Pyrites, s.,	.10 " 2.50	209.	Yttrocerite,	
39.	Whitneyite, . . .		712.	Yttrogummite, r.,	
567.	Wicklowite, r., . .		528.	Yttrotantalite, . .	.40 " 1.50
480.	Willcoxite, r., . .			Yttrotitanite, . .	
331.	Willemite, . . . .	.25 " 3.00			
431.	Williamsite, v., .	.10 " 1.50	303.	Zaratite, . . . .	.30 " 1.50
N.	Willyamite, . . .			Zeolites, 436-457, .	
389.	Wilsonite, r., . .	.50 " 2.00	613.	Zepharovichite, .	
458.	Wilsonite, r., . .		619.	Zeugite, v., . . .	
370.	Wiluite, v., . . .	.50 " 2.00	660.	Zeunerite,	1.00 " 4.00
791.	Winebergite, r., .		426.	Zeuxite, r., . . .	
269.	Winklerite, ap., .		H.	Zietrisikite, . . .	
701.	Winkworthite, r.,	.40 " 1.50	173.	Zimapanite, r., .	
407.	Withamite, v., . .	.75 " 2.50	12.	Zinc,	
279.	Witherite, . . . .	.10 " 6.00	805.	Zincaluminite, . .	
137.	Wittichenite, . . .	1.50 " 5.00	58.	Zinc Blende, s., . .	.10 " 8.00
333.	Wöhlerite, . . . .	.50 " 3.00	228.	Zincite, . . . . .	.30 " 2.50
500.	Wolchonskoite, ap.,		270.	Zincocalcite, v., .	
103.	Wolfachite, . . .		236.	Zinc-Spinel, s., . .	.50 " 7.00
812.	Wolfram, s., . . .	.50 " 3.00	749.	Zinc Vitriol, s., .	.40 " 1.50
812.	Wolframite, . . .	.50 " 3.00	289.	Zinkazurite, r., .	
329.	Wollastonite, . .	.20 " 1.50	114.	Zinkenite, . . . .	.75 " 3.00
H.	Wollongongite, . .	.10 " .50	723.	Zinkosite,	
212.	Wood Opal, v., . .	.20 " 12.00	461.	Zinnwaldite, . . .	.25 " 2.00
	Wood, Silicified		807.	Zippeite, r., . . .	
	(Petrified) v., .		394.	Zircon, . . . . .	.15 " 4.00
	210, 212, . . . .	.15 " 12.00	N.	Zirkelite,	
248.	Wood Tin, v., . .	.50 " 2.50	264.	Zirlite, r.,	
779.	Woodwardite, r., .	.75 " 3.00	481.	Zöblitzite, r., . .	
399.	Wörthite, v., . . .		406.	Zoisite, . . . . .	.20 " 3.00
818.	Wulfenite, . . . .	.30 " 8.00	457.	Zonochlorite, ap.,	.25 " 3.00
H.	Wurtzilite, . . . .	.20 " .75	52.	Zorgite, . . . . .	.50 " 2.00
69.	Wurtzite, . . . .	.30 " 1.25	369.	Zunyite, . . . . .	.40 " 1.50
			555.	Zwieselite, v., . .	
572.	Xantharsenite, r.,		316.	Zygadite, v., . . .	.75 " 2.50
160.	Xanthoconite, . .	.50 " 2.00			

LIST OF ALL KNOWN MINERALS CLASSIFIED ACCORDING TO DANA.

(“*System of Mineralogy*,” Sixth Edition, 1892)

WITH COMPLETE SUPPLEMENT.

The first synopsis of Dana's *System of Mineralogy* was published in the *Naturalist's Agency Catalogue*, issued by us in 1876. Subsequently, similar lists appeared elsewhere. The original synopsis, or “Table of Species,” gave in a condensed form the physical and chemical characters of species, but did not mention varieties or sub-species.

In the present numerical list, the number and name of every distinct species is given in **black type**, and following, the crystallization and the chemical composition in words and symbols. The old dualistic formula is employed, being generally preferred—*e. g.*, in comparing Stephanite, $5\text{Ag}_2\text{S} \cdot \text{Sb}_2\text{S}_3$, with Polybasite, $9\text{Ag}_2\text{S} \cdot \text{Sb}_2\text{S}_3$, their relationship and composition are better explained than when written Ag_5SbS_4 and Ag_9SbS_6 .

The varieties and sub-species, or “related compounds,” are given in *italics*. The list is intended to include all varieties of any importance, although many obscure or merely local names are omitted. The enumeration of pseudomorphs and other alterations constitutes another new and desirable feature. The Hydrocarbon compounds are briefly described.

THE SUPPLEMENT notices all minerals not described in the main text of Dana's *System*. The original publications were carefully reviewed and these references, dating back to the middle of 1891, are cited.

Serving as a check-list and as a useful work of reference, it is confidently hoped that this list will meet with the universal approval accorded by students to the earlier edition. The thanks of the compiler are due to Prof. E. S. Dana for valuable suggestions, kindly made during the preparation of the manuscript.

INDEX.—The position of any mineral in the following list may be found by referring to the Alphabetical Price List and Index in the preceding pages.

GENERAL CLASSIFICATION

FROM

The System of Mineralogy

OF

JAMES DWIGHT DANA.

Sixth Edition (1892).

By **EDWARD SALISBURY DANA.**

-
- I. NATIVE ELEMENTS.**
 - II. SULPHIDES, SELENIDES, TELLURIDES, ARSE-
NIDES, ANTIMONIDES.**
 - III. SULPHO-SALTS—SULPHARSENITES, SULPHAN-
TIMONITES, SULPHOBISMUTHITES.**
 - IV. HALOIDS—CHLORIDES, BROMIDES, IODIDES;
FLUORIDES.**
 - V. OXIDES.**
 - VI. OXYGEN-SALTS.**
 - 1. Carbonates.**
 - 2. Silicates, Titanates.**
 - 3. Niobates, Tantalates.**
 - 4. Phosphates, Arsenates, Vanadates; Antimonates.****Nitrates.**
 - 5. Borates. Uranates.**
 - 6. Sulphates, Chromates, Tellurates.**
 - 7. Tungstates, Molybdates.**
 - VII. SALTS OF ORGANIC ACIDS—OXALATES, MEL-
LATES, Etc.**
 - VIII. HYDROCARBON COMPOUNDS.**
-

**NEW MINERALS—A SUPPLEMENT COMPILED
FROM RECENT SCIENTIFIC LITERATURE.**

I. NATIVE ELEMENTS.

I. NON-METALS.

1. CARBON GROUP.

1. **Diamond.** Isometric; pure carbon, C.
 VARIETIES :—*Ordinary Crystals, Bort, Carbonado.*
 RELATED :—*Cliftonite (meteoric).*
2. **Graphite.** Rhombohedral; pure carbon, C.
 IMPURE FORMS :—*Tremmelite, Graphitoid, Schungite.*

2. SULPHUR GROUP.

3. **Sulphur.** Orthorhombic; pure sulphur, S.
 4. **Selensulphur.** Orthorhombic (?); a sulphur containing selenium.
 5. **Selenium.** Occurrence in nature doubtful.

II. SEMI-METALS.

3. TELLURIUM-ARSENIC GROUP.

6. **Selen-Tellurium.** Massive; tellurium containing selenium.
 7. **Tellurium.** Rhombohedral; tellurium, Te.
 8. **Arsenic.** Rhombohedral; arsenic, As.
 RELATED :—*Arsenolamprite.*
 9. **Allemontite.** Rhombohedral; arsenic containing antimony.
 RELATED :—*Antimonial arsenic.*
 10. **Antimony.** Rhombohedral; antimony containing sometimes silver, iron or arsenic, Sb.
 11. **Bismuth.** Rhomb.; pure bismuth, with occasional traces of arsenic, etc., Bi.
 12. **Zinc.** Rhombohedral; zinc, Zn.

III. METALS.

4. GOLD GROUP.

13. **Gold.** Isometric; gold usually alloyed with silver, Au.

VARIETIES :—

- | | |
|---------------------------------------|-----------------------------------|
| 1. <i>Ordinary,</i> | |
| 2. <i>Electrum (argentiferous),</i> | 4. <i>Rhodite (rhodium gold),</i> |
| 3. <i>Porpezite (palladium gold),</i> | 5. <i>Bismuth gold.</i> |

RELATED :—*Gold amalgam.*

14. **Silver.** Isometric; silver with some gold, copper, etc., Ag.

VARIETIES :—

1. *Ordinary :*
- | | | |
|--------------------------|-------------------------|-----------------------------------|
| (a) <i>crystallized,</i> | (c) <i>arborescent,</i> | 2. <i>Küstelite (auriferous),</i> |
| (b) <i>filiform,</i> | (d) <i>massive,</i> | 3. <i>Cupriferous.</i> |

ALTERS TO :—*Cerargyrite, Argentite, Red Silver Ore, Stephanite.*

15. **Copper.** Isom.; pure copper often containing some silver, bismuth, etc., Cu.

ALTERS TO :—*Cuprite, Azurite, Malachite.*

16. **Mercury.** Liquid; pure mercury with sometimes a little silver, Hg.

17. **Amalgam.** Isometric; silver containing mercury.

VARIETIES :—1. *Ordinary Amalgam,* 2. *Arguerite,* 3. *Kongsbergite.*

18. **Lead.** Isometric; nearly pure lead, Pb.

19. **Tin.** Rounded grains; nearly pure tin, Sn.

5. PLATINUM—IRON GROUP.

20. **Platinum.** Isom.; platinum alloyed with iron, iridium, etc., Pt.

VARIETIES :—1. *Non-magnetic (ordinary)*, 2. *Magnetic*.

21. **Iridium.** Isometric; iridium; Ir. with platinum.

22. **Iridosmine.** Rhombohedral; iridium with osmium.

VARIETIES :—1. *Nevyanskite*, 2. *Sisverskite*.

23. **Palladium.** Isometric; palladium alloyed with platinum and iridium, Pd.

24. **Allopladium.** Rhombohedral; palladium, Pd.

25. **Iron.** Isom.; generally about 90 per cent. pure iron, with nickel, cobalt, etc.

VARIETIES :—

1. *Terrestrial* :—

(a) *nearly pure (Greenland)*,

(b) *nickeliferous, awaruite*.

2. *Meteoric* :—

(a) *Siderites*,

(b) *Siderolites*,

(c) *Meteorite Stones*.

IRON COMPOUNDS FROM METEORIC IRONS :—*Edmonsonite, Chalypite, Cohenite, Schreibersite, Rhadite*.

II. SULPHIDES, SELENIDES, TELLURIDES, ARSENIDES, ANTIMONIDES.

I. SULPHIDES, SELENIDES, TELLURIDES OF THE SEMI-METALS.

1. REALGAR GROUP. RS. Monoclinic.

26. **Realgar.** Monoclinic; arsenic monosulphide, AsS.

ALTERS TO :—*Orpiment, Arsenolite*.

2. STIBNITE GROUP. R_2S_3 . Orthorhombic.

27. **Orpiment.** Orthorhombic (?); arsenic trisulphide, As₂S₃.

RELATED :—*Dimorphite*.

28. **Stibnite.** Orthorhombic; antimony trisulphide, Sb₂S₃.

RELATED :—*Metastibnite*.

29. **Bismuthinite.** Orthorhombic; bismuth trisulphide, Bi₂S₃.

RELATED :—*Bolivite*.

30. **Guanajuatite.** Orthorhombic; bismuth selenide, Bi₂Se₃.

RELATED :—*Silaonite*.

31. **Tetradymite.** Rhombohedral; bismuth and tellurium.

VARIETIES :—1. *Free from Sulphur*, 2. *Sulphurous*.

32. **Joseite.** Laminated; bismuth and tellurium with some sulphur and selenium.

33. **Wehrlite.** Foliated; bismuth and tellurium with some sulphur and silver.

3. MOLYBDENITE GROUP.

34. **Molybdenite.** Hexagonal (?); molybdenum disulphide, MoS₂.

II. SULPHIDES, SELENIDES, TELLURIDES, ARSENIDES, ANTIMONIDES OF THE METALS.

A. BASIC DIVISION.

35. **Dyscrasite.** Orthorhombic; a silver antimonide.

ALTERS TO :—*Pyrargyrite, Silver*.

RELATED :—*Arsenical Silver, Macfarlanite, Huntite, Animikite, Arsenargentite*.

36. **Horsfordite.** Massive; copper antimonide, Cu₃Sb.(?)

37. **Domeykite.** Massive; copper arsenide, Cu₃As.

RELATED :—*Condurrite, Orileyite*.

38. **Algodonite.** Massive; copper arsenide, Cu₃As.

39. **Whitneyite**. Massive; copper arsenide, Cu_3As .
 40. **Chilenite**. Amorphous; silver bismuthide, perhaps Ag_3Bi .
 41. **Stützite**. Hexagonal(?); a silver telluride, perhaps Ag_4Te .

B. MONOSULPHIDES, SELENIDES, TELLURIDES, ETC.

1. GALENA GROUP.—RS. Isometric, holohedral.

42. **Argentite**. Isometric; silver sulphide, Ag_2S .
 RELATED :—*Jalpaite*.
 43. **Hessite**. Isometric; silver telluride, Ag_2Te .
 44. **Petzite**. Massive; a silver and gold telluride, $(\text{Ag}, \text{Au})_2\text{Te}$.
 45. **Galena**. Isometric; lead sulphide, PbS .

VARIETIES :—

1. Ordinary :—

- | | | |
|---------------------------|--------------------------------|--------------------------|
| (a) <i>Crystallized</i> , | (c) <i>Cryptocrystalline</i> , | 4. <i>Johnstonite</i> , |
| (b) <i>Fibrous</i> , | 2. <i>Argentiferous</i> , | 5. <i>Bleichweiss</i> , |
| (c) <i>Clearable</i> , | 3. <i>Targionite</i> , | 6. <i>Steinmannite</i> . |
| (d) <i>Granular</i> , | | |

ALTERS TO :—Minium, Cerussite, Wulfenite, Chalcocite, Quartz, Pyrite, Calamine, Anglesite, Pyromorphite, Tetrahedrite, Rhodochrosite, Limonite, Pistomesite.

RELATED :—*Huascólite*, *Alisonite*, *Cuproplumbite*.

46. **Altaite**. Isometric; lead telluride, PbTe .
 RELATED :—*Henryite*.
 47. **Clausthalite**. Isometric; lead selenide, PbSe .
 VARIETIES :—1. *Ordinary*, 2. *Tilkerodite* (*cobaltiferous*).
 48. **Naumannite**. Isom.; silver selenide, Ag_2Se , or lead and silver $(\text{Ag}, \text{Pb})\text{Se}$.
 49. **Berzelianite**. Massive; copper selenide, Cu_2Se .
 50. **Lehrbachite**. Massive; lead and mercury selenide, PbSe with Hg_2Se .
 51. **Eucairite**. Isometric; copper and silver selenide, $\text{Cu}_2\text{Se}.\text{Ag}_2\text{Se}$.
 52. **Zorgite**. Massive; copper and lead selenide in varying proportion.
 53. **Crookesite**. Massive; copper and thallium selenide, with silver, $(\text{Cu}, \text{Tl}, \text{Ag})_2\text{Se}$.

2. CHALCOCITE GROUP. RS. Orthorhombic.

54. **Chalcocite**. Orthorhombic; cuprous sulphide, Cu_2S .
 ALTERS TO :—Chalcopyrite, Covellite, Bornite, Melanconite.
 RELATED :—*Harrisite*.
 55. **Stromeyerite**. Orthorhombic; silver and copper sulphide, $(\text{Ag}, \text{Cu})_2\text{S}$.
 56. **Sternbergite**. Orthorhombic; silver and iron sulphide, AgFe_2S_3 .
 VARIETIES :—1. *Sternbergite*, 2. *Frieseite*.
 RELATED :—*Argentopyrite*, *Argyropyrite*.
 57. **Acanthite**. Orthorhombic; silver sulphide, Ag_2S .
 RELATED :—*Daleminzite*.

3. SPHALERITE GROUP. RS. Isometric, tetrahedral.

58. **Sphalerite**. Isometric; zinc sulphide, ZnS .

VARIETIES :—

1. Ordinary :—

- | | | |
|-----------------------------|---------------------------|--------------------------|
| (a) <i>brown or black</i> , | 2. <i>Ferriferous</i> :— | 3. <i>Cudmiferous</i> :— |
| (b) <i>Cleophane</i> , | (a) <i>Marmatite</i> , | (<i>Pribramite</i> .) |
| (c) <i>Ruby Blend</i> . | (b) <i>Christophite</i> . | 4. <i>Mercurial</i> . |
| | | 5. <i>Stanniferous</i> . |

59. **Metacinnabarite**. Isometric; mercuric sulphide, HgS .
 RELATED :—*Guadalcazarite*, *Levignianite*.
 60. **Tiemannite**. Isometric; mercuric selenide, HgSe .
 61. **Onofrite**. Massive; mercury sulpho-selenide, $\text{Hg}(\text{S}, \text{Se})$.
 62. **Coloradoite**. Massive; mercuric telluride, HgTe .
 63. **Alabandite**. Isometric; manganese sulphide, MnS .
 64. **Oldhamite**. Isometric; calcium sulphide, CaS . (meteoric).
 RELATED :—*Osbornite* (meteoric).
 65. **Pentlandite**. Isometric; iron and nickel sulphide, $(\text{FeNi})\text{S}$.

4. CINNABAR—WURTZITE—MILLERITE GROUP. Rhombohedral or Hexagonal.

66. **Cinnabar.** Rhombohedral; mercuric sulphide, HgS .

VARIETIES:—

1. *Ordinary*:—(a) *Crystallized*,(c) *Earthy*,2. *Hepatic*.(b) *Massive*,67. **Covellite.** Hexagonal; cupric sulphide, CuS .RELATED:—*Cantonite*.68. **Greenockite.** Hexagonal; cadmium sulphide, CdS .69. **Wurtzite.** Hexagonal; zinc sulphide, ZnS .RELATED:—*Erythrozincite*.70. **Millerite.** Rhombohedral; nickel sulphide, NiS .RELATED:—*Jaipurite*.71. **Niccolite.** Hexagonal; nickel arsenide, NiAs .72. **Breithauptite.** Hexagonal; nickel antimonide, NiSb .73. **Troilite.** Massive; iron sulphide, FeS (meteoric).74. **Pyrrhotite.** Hexagonal; iron sulphide, containing sometimes 5 per cent. nickel, $\text{Fe}_{10}\text{S}_{12}$.ALTERS TO:—*Pyrite*, *Siderite*, *Limonite*.RELATED:—*Kroebertite*, *Horbachite*.

C. INTERMEDIATE DIVISION.

GROUP 1.

75. **Polydymite.** Isometric; nickel sulphide, $\text{Ni}_4\text{S}_3(?)$.RELATED:—*Grünaute*.76. **Beyrichite.** Prismatic; a nickel sulphide, $\text{Ni}_3\text{S}_4(?)$.77. **Melonite.** Hexagonal; a nickel telluride, $\text{Ni}_2\text{Te}_3(?)$.

GROUP 2.

78. **Bornite.** Isometric; copper and iron sulphide, Cu_3FeS_3 , varying.RELATED:—*Castillite*.79. **Linnæite.** Isometric; cobalt sulphide, Co_3S_4 .VARIETIES:—1. *Ordinary*, 2. *Siegenite*.80. **Daubreelite.** Massive; chromium and iron sulphide, $\text{FeS.Cr}_2\text{S}_3$.81. **Cubanite.** Isometric; iron and copper sulphide, CuFe_2S_4 .RELATED:—*Chalcopyrrhotite*.82. **Carrollite.** Isometric; copper and cobalt sulphide, $\text{CuS.Co}_3\text{S}_4$.83. **Chalcopyrite.** Tetragonal; copper and iron sulphide, CuFeS_2 , varying.ALTERS TO:—*Malachite*, *Chrysocola*, *Chalcocite*, *Tetrahedrite*, *Covellite*, *Melaconite*, *Iron oxide*, *Sulphate*.RELATED:—*Barnhardite*, *Homichlin*, *Ducktownite*.84. **Stannite.** Massive; tin, copper, iron, and often zinc sulphide, perhaps $\text{Cu}_3\text{S.FeS.SnS}_2$.

D. DISULPHIDES, DIARSENIDES, ETC.

1. PYRITE GROUP. RS_2 , RAs_2 , RSb_2 . Isometric, pyritohedral.85. **Pyrite.** Isometric; iron disulphide, $\text{FeS}_2(?)$.ALTERS TO:—*Limonite*, *Green vitriol*, *Göthite*, *Hematite*, *Quartz*, *Graphite*.86. **Hauerite.** Isometric; manganese disulphide, MnS_2 .87. **Smaltite.** Isometric; cobalt diarsenide, CoAs_2 .NOTE.—*Smaltite* and *Chloanthite* graduate chemically into each other.88. **Chloanthite.** Isometric; nickel diarsenide, NiAs_2 .89. **Cobaltite.** Isometric; cobalt sulph-arsenide, $\text{CoS}_2.\text{CoAs}_2$.VARIETIES:—1. *Ordinary*, 2. *Ferrocobaltite*.90. **Gersdorffite.** Isometric; nickel sulph-arsenide, $\text{NiS}_2.\text{NiAs}_2$.RELATED:—*Sommarugaite*, *Tombazite*.91. **Corynite.** Isometric; nickel sulph-antimon-arsenide, Ni(As,Sb)S .92. **Ullmannite.** Isometric; nickel sulph-antimonide, $\text{NiS}_2.\text{NiSb}_2$.93. **Sperrylite.** Isometric; platinum arsenide, PtAs_2 .94. **Laurite.** Isometric; ruthenium sulphide (and osmium 3.03 per cent.), RuS_2 .95. **Skutterudite.** Isometric; cobalt arsenide, CoAs_3 .

2. MARCASITE GROUP. RS_2 , Etc. Orthorhombic.96. Marcasite. Orthorhombic; iron sulphide, FeS_2 .

VARIETIES:—

- | | | |
|-------------------------------|-------------------------------|-------------------------|
| 1. <i>Radiated</i> , | 4. <i>Capillary Pyrites</i> , | 7. <i>Arsenical</i> , |
| 2. <i>Cockscomb Pyrites</i> , | 5. <i>Hepatic</i> , | 8. <i>Stalactitic</i> . |
| 3. <i>Spear Pyrites</i> , | 6. <i>Cellular</i> , | |
- ALTERS TO:—Limonite, Bournonite, Magnetite, Pyrite, Chalcopyrite, Sphalerite.

97. Löllingite. Orthorhombic; iron diarsenide, FeAs_2 .

VARIETIES:—

- | | | |
|------------------------|-------------------------|---|
| 1. <i>Löllingite</i> , | 2. <i>Leucopyrite</i> , | 3. <i>Geyerite</i> , |
| | | 4. <i>Glaucopyrite, cobaltiferous</i> . |

RELATED:—*Pacite*.98. Arsenopyrite. Orthorhombic; iron sulph-arsenide, FeAsS .VARIETIES:—1. *Ordinary*, 2. *Danaite (cobaltiferous)*, 3. *Niccoliferous*.RELATED:—*Crucite*.99. Safflorite. Orthorhombic; cobalt diarsenide, CoAs_2 .100. Rammelsbergite. Orthorhombic; essentially nickel diarsenide, NiAs_2 .101. Glaucodot. Orthorhombic; cobalt and iron sulph-arsenide, $(\text{CoFe})\text{AsS}$.102. Alloclasite. Orthorh.; cobalt (and iron) sulph-arsen-bismuthide, $\text{Co}(\text{As}, \text{Bi})\text{S}$.103. Wolfachite. Orthorhombic; probably $\text{Ni}(\text{As}, \text{Sb})\text{S}$.

3. SYLVANITE GROUP.

104. Sylvanite. Monoclinic; gold and silver telluride, $(\text{AuAg})\text{Te}_2$.RELATED:—*Müllerine*.

105. Krennerite. Orthorhombic; a gold and silver telluride.

RELATED:—*Calaverite*.

106. Nagyagite. Orthorhombic; lead and gold sulpho-telluride, with antimony.

RELATED:—*Silberphyllinglanz*.

OXYSULPHIDES.

107. Kermesite. Monoclinic; antimony oxysulphide, $2\text{Sb}_2\text{S}_3 \cdot \text{Sb}_2\text{O}_3$.108. Voltzite. Globules; zinc oxysulphide, $\text{Zn}_3\text{S}_4\text{O}$.

APPENDIX TO SULPHIDES, ETC.

Arsenotellurite,
Bolivianite,
Kaneite,

Plakodin,
Copper and Silver Sulphide,
Plumbomanganite,

Plumbostannite,
Vallerite,
Youngite.

III. SULPHO-SALTS.

I. SULPHARSENITES, SULPHANTIMONITES, ETC.

A. ACIDIC DIVISION.

109. Livingstonite. Prismatic (?); mercury; sulph-antimonite, $\text{HgS} \cdot 2\text{Sb}_2\text{S}_3$.110. Guejarite. Orthorhombic; copper sulphantimonite, $\text{Cu}_2\text{S} \cdot 2\text{Sb}_2\text{S}_3$.111. Chiviatite. Foliated; lead sulpho-bismuthite, $2\text{PbS} \cdot 3\text{Bi}_2\text{S}_3$.112. Cuprobismutite. Prismatic crystals; copper sulpho-bismuthite, $3\text{Cu}_2\text{S} \cdot 4\text{Bi}_2\text{S}_3$.RELATED:—*Dognacskaite*.113. Rezbanyite. Massive; lead sulpho-bismuthite, $4\text{PbS} \cdot 5\text{Bi}_2\text{S}_3$.

B. META-DIVISION.

ZINKENITE GROUP. $\text{RS}(\text{As}, \text{Sb}, \text{Bi})_2\text{S}_3$. Orthorhombic.114. Zinkenite. Orthorhombic; lead sulphantimonite, $\text{PbS} \cdot \text{Sb}_2\text{S}_3$.115. Sartorite. Orthorhombic; lead sulpharsenite, $\text{PbS} \cdot \text{As}_2\text{S}_3$.

116. **Emplectite**. Orthorhombic; copper sulphobismuthite, $\text{Cu}_2\text{S.Bi}_2\text{S}_3$.
 117. **Chalcostibite**. Orthorhombic; copper sulphantimonite, $\text{Cu}_2\text{S.Sb}_2\text{S}_3$.
 118. **Galenobismutite**. Columnar; lead sulphobismuthite, $\text{PbS.Bi}_2\text{S}_3$.
 VARIETIES:—1. *Ordinary*, 2. *Argentiferous* (*Alaskaite*), 3. *Seleniferous*.
 119. **Berthierite**. Prismatic; iron sulphantimonite, $\text{FeS.Sb}_2\text{S}_3$. (?)
 120. **Matildite**. Prismatic; silver sulphobismuthite, $\text{Ag}_2\text{S.Bi}_2\text{S}_3$.
 RELATED:—*Plenargyrite*.
 121. **Miargyrite**. Monoclinic; silver sulphantimonite, $\text{Ag}_2\text{S.Sb}_2\text{S}_3$.

C. INTERMEDIATE DIVISION.

122. **Plagionite**. Monoclinic; lead sulphantimonite, $5\text{PbS.4Sb}_2\text{S}_3$ (?).
 123. **Binnite**. Isometric; copper sulpharsenite, $3\text{Cu}_2\text{S.2As}_2\text{S}_3$ (?).
 124. **Klaprotholite**. Orthorhombic; copper sulphobismuthite, $3\text{Cu}_2\text{S.2Bi}_2\text{S}_3$.
 125. **Schirmerite**. Massive; lead and silver sulphobismuthite, $3(\text{Ag}_2, \text{Pb})\text{S.2Bi}_2\text{S}_3$.
 126. **Warrenite**. Acicular; lead sulphantimonite, $3\text{PbS.2Sb}_2\text{S}_3$.
 * **JAMESONITE GROUP**. 2RS. $(\text{As, Sb, Bi})_2\text{S}_3$. Orthorhombic.
 127. **Dufrenoyite**. Orthorhombic; lead sulpharsenite, $2\text{PbS.As}_2\text{S}_3$.
 128. **Cosalite**. Orthorhombic; lead sulphobismuthite, $2\text{PbS.Bi}_2\text{S}_3$.
 129. **Schappachite**. Orthorhombic (?); lead and silver sulphobismuthite, $\text{PbS.}-\text{Ag}_2\text{S.Bi}_2\text{S}_3$.
 130. **Jamesonite**. Orthorhombic; lead sulphantimonite, $2\text{PbS.Sb}_2\text{S}_3$.
 ALTERS TO:—*Bindheimite*.
 131. **Kobellite**. Massive; lead sulphantimon-bismuthite, $2\text{PbS.}(\text{Bi, Sb})_2\text{S}_3$.
 132. **Brongniardite**. Isom.; lead and silver, sulphantimonite, $\text{PbS.Ag}_2\text{S.Sb}_2\text{S}_3$.
 133. **Semseyite**. Monoclinic; lead sulphantimonite, $7\text{PbS.3Sb}_2\text{S}_3$. (?)
 134. **Diaphorite**. Orthorh.; lead and silver sulphantimonite, $5(\text{Pb, Ag}_2)\text{S.2Sb}_2\text{S}_3$.
 135. **Freieslebenite**. Monoc.; lead and silver sulphantimonite, $5(\text{Pb, Ag}_2)\text{S.2Sb}_2\text{S}_3$.

D. ORTHO DIVISION.

BOURNONITE GROUP. 3RS. $(\text{As, Sb, Bi})_2\text{S}_3$. Orthorhombic.

136. **Bournonite**. Orthorh.; lead and copper sulphantimonite, $3(\text{Pb, Cu}_2)\text{S.Sb}_2\text{S}_3$.
 ALTERS TO:—*Cerussite*, *Azurite*, *Malachite*, *Wölschite*.
 137. **Wittichenite**. Orthorhombic; copper sulphobismuthite, $3\text{Cu}_2\text{S.Bi}_2\text{S}_3$.
 138. **Aikinite**. Orthorh.; lead and copper sulphobismuthite, $3(\text{Pb, Cu}_2)\text{S.Bi}_2\text{S}_3$.
 139. **Boulangerite**. Massive; lead sulphantimonite, $3\text{PbS.Sb}_2\text{S}_3$.
 140. **Lillianite**. Massive; lead sulphobismuthite, $3\text{PbS.Bi}_2\text{S}_3$.
 141. **Stylotypite**. Orthorhombic; copper, silver, and iron sulphantimonite, $3(\text{Cu}_2, \text{Ag}_2, \text{Fe})\text{S.Sb}_2\text{S}_3$.
 RELATED:—*Dürfeldtite*.
 142. **Guitermanite**. Massive; lead sulpharsenite, $10\text{PbS.3As}_2\text{S}_3$.
 143. **Tapalpite**. Massive; bismuth and silver sulphotelluride, $3\text{Ag}_2(\text{S, Te}).\text{Bi}_2(\text{S, Te})_3$ (?).

PYRARGYRITE GROUP. $3\text{Ag}_2\text{S.}(\text{As, Sb})_2\text{S}_3$. Rhombohedral, hemimorphic.

144. **Pyrargyrite**. Rhombohedral; silver sulphantimonite, $3\text{Ag}_2\text{S.Sb}_2\text{S}_3$.
 ALTERS TO:—*Argentite*.
 145. **Proustite**. Rhombohedral; silver sulpharsenite, $3\text{Ag}_2\text{S.As}_2\text{S}_3$.
 146. **Pyrostilpnite**. Monoclinic; silver sulphantimonite, $3\text{Ag}_2\text{S.Sb}_2\text{S}_3$.
 147. **Rittingerite**. Monoclinic; arsenic, selenium, and silver.

E. BASIC DIVISION.

TETRAHEDRITE GROUP. 4RS. $(\text{Sb, As})_2\text{S}_3$. Isometric, tetrahedral.

148. **Tetrahedrite**. Isometric; copper sulphantimonite, $4\text{Cu}_2\text{S.Sb}_2\text{S}_3$.

VARIETIES:—

1. *Ordinary*, 2. *Argentiferous* (*Freibergite*), 3. *Mercurial* (*Schwarzite*), 4. *Plumbiferous*.

ALTERS TO:—*Chalcopyrite*, *Malachite*, *Azurite*, *Amalgam*, *Bournonite*, *Erythrite*, *Cinnabar*, *Covellite*.

NOTE.—Tetrahedrite and Tennantite graduate chemically into each other.

149. **Tennantite.** Isometric; copper sulpharsenite, $4\text{CuS.As}_2\text{S}_3$.
 VARIETIES:—1. *Ordinary*, 2. *Sandbergerite*, 3. *Fredricite*, 4. *Rionite*, 5. *Annivite*.
 RELATED:—*Nepaulite*, *Fieldite*, *Polytelite*, *Clayite*.
 150. **Jordanite.** Orthorhombic; lead sulpharsenite, $4\text{PbS.As}_2\text{S}_3$.
 151. **Meneghinite.** Orthorhombic; lead sulphantimonite, $4\text{PbS.Sb}_2\text{S}_3$.
 152. **Geocronite.** Orthorhombic; lead sulphantimonite, $5\text{PbS.Sb}_2\text{S}_3$.
 153. **Stephanite.** Orthorhombic; silver sulphantimonite, $5\text{Ag}_2\text{S.Sb}_2\text{S}_3$.
 ALTERS TO:—Silver.
 154. **Kilbrickenite.** Massive; lead sulphantimonite, perhaps $6\text{PbS.Sb}_2\text{S}_3$.
 155. **Beegerite.** Isometric (?); lead sulphobismuthite, $6\text{PbS.Bi}_2\text{S}_3$.
 RELATED:—*Richmondite*.
 156. **Polybasite.** Orthorhombic; silver sulphantimonite, $9\text{Ag}_2\text{S.Sb}_2\text{S}_3$.
 ALTERS TO:—Stephanite, Pyrite.
 157. **Polyargyrite.** Isometric; silver sulphantimonite, $12\text{Ag}_2\text{S.Sb}_2\text{S}_3$.

II. SULPHARSENATES, SULPHANTIMONATES, ETC.

ENARGITE GROUP.

158. **Enargite.** Orthorhombic; copper sulpharsenate, $3\text{Cu}_2\text{S.As}_2\text{S}_5$.
 RELATED:—*Lautite*, *Clarite*, *Luzonite*.
 NOTE.—Enargite and Famatinite graduate chemically toward each other.
 159. **Famatinite.** Orthorhombic; copper sulphantimonate, $3\text{Cu}_2\text{S.Sb}_2\text{S}_5$.
 160. **Xanthoconite.** Rhombohedral; silver sulpharsenate, $3\text{Ag}_2\text{S.As}_2\text{S}_5$.
 161. **Epiboulangerite.** Orthorhombic (?); lead sulphantimonate, $3\text{PbS.Sb}_2\text{S}_5$.
 162. **Epigenite.** Orthorh.; copper and iron sulpharsenate, $4\text{Cu}_2\text{S}_3\text{FeS.As}_2\text{S}_5(?)$.
 RELATED:—*Regnolite*.
 163. **Argyrodite.** Monoclinic; silver and germanium sulphide, $3\text{Ag}_2\text{S.GeS}_2$.

IV. HALOIDS.—CHLORIDES, BROMIDES, IODIDES, FLUORIDES.

I. ANHYDROUS CHLORIDES, BROMIDES, IODIDES; FLUORIDES.

CALOMEL GROUP. $\overset{\text{I}}{\text{R}_2\text{Cl}_2}$

164. **Calomel.** Tetragonal; mercurous chloride, Hg_2Cl_2 .
 RELATED:—*Mercuric chloride*.
 165. **Nantokite.** Isometric; cuprous chloride, Cu_2Cl_2 .

HALITE GROUP. $\overset{\text{I}}{\text{RCl}}$, etc. Isometric.

166. **Halite.** Isometric; sodium chloride, NaCl .
 ALTERS TO:—Anhydrite, Polyhalite, Dolomite, Hematite, Gypsum, Celestite, Quartz, Pyrite.
 RELATED:—*Martinsite*, *Hydrohalite*, *Huantajayite*.
 167. **Sylvite.** Isometric; potassium chloride, KCl .
 168. **Sal-ammoniac.** Isometric; ammonium chloride, NH_4Cl .
 169. **Cerargyrite.** Isometric; silver chloride, AgCl .
 RELATED:—*Bordosite*.
 170. **Embolite.** Isometric; silver chlorobromide, $\text{Ag}(\text{Cl},\text{Br})$.
 171. **Bromyrite.** Isometric; silver bromide, AgBr .
 172. **Iodobromite.** Isometric; silver chloriodobromide, $2\text{AgCl}.2\text{AgBr}.\text{AgI}$.
 173. **Iodyrite.** Hexagonal; silver iodide, AgI .
 RELATED:—*Tocornalite*, *Zimapanite*, *Zinc Iodide*, *Coccinite*, *Bustamentite*, *Zinc Bromide*.

FLUORITE GROUP.— $\overset{\text{II}}{\text{R}(\text{Cl},\text{F})_2}$. Isometric.

174. **Hydrophilite.** Isometric; calcium chloride, CaCl_2 .

175. **Fluorite.** Isometric; calcium fluoride, CaF_2 .

VARIETIES:—

1. *Ordinary*:—

- (a) *cleavable to crystallized in many colors,* (c) *granular,*
(b) *fibrous,* (d) *earthy.*

2. *Antozonite.*

ALTERS TO:—Quartz, Hematite, Psilomelane, Smithsonite, Kaolinite, Limonite, Lithomarge, Calamine, Cerussite, Calcite.

RELATED:—*Bruickite, Gunnisonite.*

176. **Chloromagnesite.** A deliquescent mass; magnesium chloride, MgCl_2 .177. **Sellaite.** Tetragonal; magnesium fluoride, MgF_2 .178. **Lawrencite.** A deliquescent mass; ferrous chloride, FeCl_2 .179. **Scacchite.** A deliquescent mass; manganese protochloride, MnCl_2 .

RELATED:—*Chloraluminite.*

180. **Cotunnite.** Orthorhombic; lead chloride, PbCl_2 .

RELATED:—*Pseudocotunnite.*

181. **Molysite.** Incrusting; ferric chloride, FeCl_3 .182. **Tysonite.** Hexagonal; fluoride of cerium metals. $(\text{Ce, La, Di})\text{F}_3$.

ALTERS TO:—*Bastnäsité.*

183. **Cryolite.** Monoclinic; sodium and aluminium fluoride, Na_3AlF_6 .

RELATED:—*Elpasolite.*

184. **Chiolite.** Tetragonal; aluminium and sodium fluoride, $5\text{NaF} \cdot 3\text{AlF}_3$.

RELATED:—*Chodocffite.*

185. **Hieratite.** Isometric; potassium and silicon fluoride, $2\text{KF} \cdot \text{SiF}_4$.

RELATED:—*Hydrofluorite, Cryptohalite, Proidonite.*

II. OXYCHLORIDES, OXYFLUORIDES.

A. OXYCHLORIDES.

186. **Matlockite.** Tetragonal; lead oxychloride, $\text{PbCl}_2 \cdot \text{PbO}$.187. **Mendipite.** Orthorhombic; lead oxychloride, $\text{PbCl}_2 \cdot 2\text{PbO}$.188. **Schwartzembergite.** Rhombohedral; lead oxychloriodide, $\text{Pb}(\text{I, Cl})_2 \cdot 2\text{PbO} (?)$.189. **Laurionite.** Orthorhombic; basic lead chloride, $\text{PbCl}_2 \cdot \text{Pb}(\text{OH})_2$.190. **Daviesite.** Orthorhombic; lead oxychloride.191. **Fiedlerite.** Monoclinic; lead oxychloride.192. **Percylite.** Isometric; hydrated lead and copper oxychloride, $\text{PbCuO}_2 \cdot \text{H}_2\text{Cl}_2 (?)$.193. **Atacamite.** Orthorhombic; hydrous copper oxychloride, $\text{CuCl}_2 \cdot 3\text{Cu}(\text{OH})_2$.

ALTERS TO:—*Malachite, Chrysocolla.*

RELATED:—*Tallingite, Erythrocalcite, Melanothalite, Ateelite.*

194. **Daubréeite.** Amorphous; a hydrated bismuth oxychloride, $2\text{Bi}_2\text{O}_3 \cdot \text{BiCl}_3 \cdot 3\text{H}_2\text{O} (?)$.

B. OXYFLUORIDES.

195. **Nocerite.** Hexagonal; a calcium and magnesium oxyfluoride, $2(\text{Ca, Mg})\text{F}_2 \cdot (\text{Ca, Mg})\text{O} (?)$.

RELATED:—*Fluosiderite, Pseudonocerina.*

196. **Fluocerite.** Massive; oxyfluoride of cerium and yttrium metals, $(\text{Ce, La, Di, Y, Er, Yt})_2\text{OF}_4$.

A. HYDROUS CHLORIDES.

197. **Bischofite.** Granular; hydrous magnesium chloride, $\text{MgCl}_2 + 6\text{H}_2\text{O}$.198. **Kremersite.** Isometric; hydrous potassium, ammonium and iron chloride, $\text{KCl} \cdot \text{NH}_4\text{Cl} \cdot \text{FeCl}_3 + \text{H}_2\text{O}$.199. **Erythrosiderite.** Orthorhombic; hydrous potassium and iron chloride, $2\text{KCl} \cdot \text{FeCl}_3 \cdot \text{H}_2\text{O}$.200. **Douglasite.** Hydrous potassium and iron chloride, $2\text{KCl} \cdot \text{FeCl}_2 \cdot 2\text{H}_2\text{O} (?)$.201. **Carnallite.** Orthorhombic; hydrous potassium and magnesium chloride, $\text{KCl} \cdot \text{MgCl}_2 + 6\text{H}_2\text{O}$.202. **Tachhydrite.** Rhombohedral; hydrous calcium and magnesium chloride, $\text{CaCl}_2 \cdot 2\text{MgCl}_2 + 12\text{H}_2\text{O}$.203. **Fluellite.** Orthorhombic; a hydrous aluminium fluoride, $\text{AlF}_3 + \text{H}_2\text{O}$.204. **Prosopite.** Monoc.; a hydrous alum. and calcium fluoride, $\text{CaF}_2 \cdot 2\text{Al}(\text{F, OH})_3$.

205. **Pachnolite.** Monoclinic; a hydrous aluminium, calcium and sodium fluoride, $\text{NaF} \cdot \text{CaF}_2 \cdot \text{AlF}_3 \cdot \text{H}_2\text{O}$.
206. **Thomsenolite.** Monoclinic; hydrous aluminium, calcium and sodium fluoride, $\text{NaF} \cdot \text{CaF}_2 \cdot \text{AlF}_3 \cdot \text{H}_2\text{O}$.
- RELATED :—*Hagemannite*.
207. **Gearksutite.** Masses of minute needles; perhaps a hydrous calcium and aluminium fluoride, $\text{CaF}_2 \cdot \text{Al}(\text{F}, \text{OH})_3 \cdot \text{H}_2\text{O}$.
208. **Ralstonite.** Isometric; a hydrous sodium and aluminium fluoride, $(\text{Na}_2, \text{Mg})\text{-F}_2 \cdot 3\text{Al}(\text{F}, \text{OH})_3 \cdot 2\text{H}_2\text{O}$.
209. **Yttrocerite.** Massive; a calcium fluoride with the cerium and yttrium metals, $2(2[\text{Ce}, \text{La}, \text{Di}, \text{Y}, \text{Er}]\text{F}_3 \cdot 9\text{CaF}_2 + 3\text{H}_2\text{O})$.

V. OXIDES.

I. OXIDES OF SILICON.

210. **Quartz.** Rhombohedral; silicon dioxide, SiO_2 .

A. PHENOCRYSTALLINE OR VITREOUS VARIETIES :—

- | | | |
|-------------------------------------|-------------------------------------|------------------------------|
| 1. <i>Rock Crystal</i> :— | 8. <i>Sapphire-quartz</i> , | (g) <i>Hornblende</i> , |
| (a) <i>Cavernous</i> , | 9. <i>Aventurine</i> , | (h) <i>Epidote</i> . |
| (b) <i>Capped</i> , | 10. <i>Containing liquids with</i> | 12. <i>Cat's-Eye</i> , |
| (c) <i>Drusy</i> , | moving bubble, | 13. <i>Tiger-Eye</i> , |
| (d) <i>Radiated</i> , | 11. <i>Sagenitic, containing</i> :— | 14. <i>Impure from Miner</i> |
| (e) <i>Fibrous</i> . | (a) <i>Rutile</i> , | als :— |
| 2. <i>Star-quartz</i> (asteriated), | (b) <i>Black Tourma-</i> | (a) <i>Ferruginous</i> , |
| 3. <i>Amethyst</i> , | line, | (b) <i>Chloritic</i> , |
| 4. <i>Rose-quartz</i> , | (c) <i>Göthite</i> , | (c) <i>Actinolitic</i> , |
| 5. <i>Citrine</i> (yellow), | (d) <i>Stibnite</i> , | (d) <i>Micaceous</i> , |
| 6. <i>Smoky-quartz</i> , | (e) <i>Asbestos</i> , | (e) <i>Arenaceous</i> . |
| 7. <i>Milky-quartz</i> , | (f) <i>Actinolite</i> , | |

B. CRYPTOCRYSTALLINE VARIETIES :—

- | | | |
|---------------------------------------|--|----------------------------|
| 1. <i>Chalcedony</i> , | (c) <i>Moss</i> . | (b) <i>Brownish</i> , |
| 2. <i>Carnelian</i> , | 8. <i>Onyx</i> , | (c) <i>Dark green</i> , |
| 3. <i>Chrysoprase</i> , | 9. <i>Sardonyx</i> , | (d) <i>Grayish blue</i> , |
| 4. <i>Prase</i> , | 10. <i>Agate—Jasper</i> , | (e) <i>Blackish</i> , |
| 5. <i>Plasma</i> , | 11. <i>Siliceous Sinter</i> , | (f) <i>Riband Jasper</i> , |
| 6. <i>Blood-stone</i> (<i>Helio-</i> | 12. <i>Flint</i> , | (g) <i>Egyptian Jasper</i> |
| <i>trope</i>), | 13. <i>Hornstone</i> (<i>Chert</i>), | (h) <i>Jasponyx</i> , |
| 7. <i>Agate</i> :— | 14. <i>Touchstone</i> , | (i) <i>Jasperized wood</i> |
| (a) <i>Banded</i> , | 15. <i>Jasper</i> :— | |
| (b) <i>Fortification</i> , | (a) <i>Red</i> , | |

OTHER VARIETIES :—

- | | | |
|---------------------------------|-----------------------------|------------------------------|
| 1. <i>Granular-quartz</i> , | 6. <i>Cotterite</i> . | (c) <i>Babel-quartz</i> , |
| 2. <i>Quartzose Sandstone</i> , | 7. <i>Pseudomorphous</i> | (d) <i>Silicified shells</i> |
| 3. <i>Quartz Conglomerate</i> , | Quartz :— | (e) <i>Silicified wood</i> |
| 4. <i>Flexible Sandstone</i> , | (a) <i>Tabular-quartz</i> , | (f) <i>Beckite</i> . |
| 5. <i>Buhrstone</i> , | (b) <i>Haytorite</i> , | |

ALTERS TO :—Pyrite, Magnetite, Voltzite, Cassiterite, Hematite.

211. **Tridymite.** Hexagonal (?); pure silica, SiO_2 .

RELATED :—

Asmanite,
Cristobalite,
Granuline,

Melanophlogite,
Sulfuricin,
Vestan,

Jenzschite,
Passyite.

212. Opal. Amorphous; silica, with varying amount of water, $\text{SiO}_2 \cdot n\text{H}_2\text{O}$.

VARIETIES :—

- | | | |
|---------------------------|---------------------------|-------------------------------|
| 1. <i>Precious Opal</i> , | (f) <i>Forcherite</i> . | (b) <i>Michaelite</i> , |
| 2. <i>Fire-opal</i> , | 5. <i>Cacholong</i> , | (c) <i>Geyserite</i> . |
| 3. <i>Girasol</i> , | 6. <i>Opal-agate</i> , | 12. <i>Float-stone</i> , |
| 4. <i>Common Opal</i> :— | 7. <i>Menilite</i> , | 13. <i>Tripolite</i> :— |
| (a) <i>Milk-opal</i> , | 8. <i>Jasp-opal</i> , | (a) <i>Infusorial Earth</i> , |
| (b) <i>Resin-opal</i> , | 9. <i>Wood-opal</i> , | (b) <i>Randannite</i> , |
| (c) <i>Green</i> , | 10. <i>Hyalite</i> , | (c) <i>Tripoli Slate</i> , |
| (d) <i>Brick-red</i> , | 11. <i>Fiorite</i> :— | (d) <i>Alumocalcite</i> . |
| (e) <i>Hydrophane</i> , | (a) <i>Pearl-sinter</i> , | |

RELATED :—*Lussatite*, *Tabasheer*.

II. OXIDES OF THE SEMI-METALS; also MO and W.

1. ARSENOLITE GROUP. R_2O_3 . Isometric.

213. Arsenolite. Isometric; arsenic trioxide, As_2O_3 .

214. Senarmontite. Isometric; antimony trioxide, Sb_2O_3 .

ALTERS TO :—*Stibnite*.

2. VALENTINITE GROUP. R_2O_3 .

215. Claudetite. Monoclinic; arsenic trioxide, As_2O_3 .

216. Valentinite. Orthorhombic; antimony trioxide, Sb_2O_3 .

217. Bismite. Orthorhombic; bismuth trioxide, Bi_2O_3 .

RELATED :—*Karelinite*, *Tantalie Ocher*, *Vanadic Ocher*.

3. TELLURITE GROUP. RO_2 . Orthorhombic.

218. Tellurite. Orthorhombic; tellurium dioxide, TeO_2 .

RELATED :—*Selenolite*.

4. MOLYBDITE GROUP.

219. Molybdate. Orthorhombic; molybdenum trioxide, MoO_3 .

RELATED :—*Ilsemanite*.

220. Tungstite. Orthorhombic; tungsten trioxide, WO_3 .

RELATED :—*Meymacite*.

221. Cervantite. Orthorhombic; antimony dioxide, $\text{Sb}_2\text{O}_3 \cdot \text{Sb}_2\text{O}_5$.

222. Stibiconite. Massive; a hydrous antimony dioxide, $\text{Sb}_2\text{O}_4 \cdot \text{H}_2\text{O} (?)$.

RELATED :—*Volgerite*, *Stibianite*, *Partzite*, *Ricotite*, *Stibioferrite*, *Stetefeldite*.

III. OXIDES OF THE METALS.

A. ANHYDROUS OXIDES.

I. PROTOXIDES. R_2O and RO .

223. Water. Hydrogen oxide, H_2O .

STATES OF EXISTENCE :—

1. *Solid*, *Ice* (hexagonal); 2. *Liquid*, *Water*; 3. *Gas*, *Steam* and *Aqueous Vapor*.

224. Cuprite. Isometric; cuprous oxide, Cu_2O .

VARIETIES :—

1. *Ordinary* :—

 (a) *crystallized*,

 (b) *massive*,

2. *Chalcotrichite*,

3. *Tile Ore*.

ALTERS TO :—*Native copper*, *Malachite*, *Azurite*, *Chrysocolla*, *Melaconite*, *Limonite*.

RELATED —*Hydrocuprite*.

PERICLASE GROUP. RO. Isometric.

225. **Periclase.** Isometric; magnesium oxide, MgO .
 226. **Manganosite.** Isometric; manganese protoxide, MnO .
 227. **Bunsenite.** Isometric; nickel protoxide, NiO .
 228. **Zincite.** Hexagonal; zinc oxide, ZnO .

RELATED:—*Calcozincite*.

229. **Massicot.** Massive; lead monoxide, PbO .
 230. **Tenorite.** Monoclinic; cupric oxide, CuO .

VARIETIES:—1. *Ordinary*, 2. *Melaconite*.RELATED:—*Marcylite*, *Lime*, *Palladinite*.II. SESQUIOXIDES. R_2O_3 .

HEMATITE GROUP. Rhombohedral.

231. **Corundum.** Rhombohedral; alumina, Al_2O_3 .
 VARIETIES:—1. *Sapphire*, 2. *Ruby*, 3. *Corundum*, 4. *Emery*.
 232. **Hematite.** Rhombohedral; iron sesquioxide, Fe_2O_3 .

VARIETIES:—

- | | | |
|---------------------------|------------------------------|-----------------------------|
| 1. <i>Specular</i> :— | (c) <i>Massive</i> . | 4. <i>Clay Iron-stone</i> . |
| (a) <i>Crystallized</i> , | 2. <i>Compact Columnar</i> , | |
| (b) <i>Micaceous</i> , | 3. <i>Red Ocherous</i> , | |

ALTERS TO:—*Magnetite*, *Siderite*, *Pyrite*, *Limonite*.RELATED:—*Martite*, *Raphisiderite*.

233. **Ilmenite.** Rhombohedral; an iron and titanium oxide, generally FeTiO_3 .

VARIETIES:—

- | | | |
|--------------------------|---------------------------|------------------------------|
| 1. <i>Kibdelophane</i> , | 5. <i>Hystatite</i> , | 9. <i>Kragerö hematite</i> , |
| 2. <i>Crichtonite</i> , | 6. <i>Washingtonite</i> , | 10. <i>Magnesian</i> , |
| 3. <i>Ilmenite</i> , | 7. <i>Uddevallite</i> , | 11. <i>Paracolumbite</i> . |
| 4. <i>Menaccanite</i> , | 8. <i>Eisenrosen</i> , | |

RELATED:—*Hydroilmenite*, *Ferrozincite*, *Iserine*.

III. INTERMEDIATE OXIDES.

SPINEL GROUP. $\text{RO} \cdot \text{R}_2\text{O}_3$. Isometric.

234. **Spinel.** Isometric; magnesium aluminate, $\text{MgO} \cdot \text{Al}_2\text{O}_3$.

VARIETIES:—

1. *Ordinary*, 2. *Ruby Spinel*, 3. *Ceylonite*, 4. *Chlorospinel*, 5. *Picotite*.

ALTERS TO:—*Steatite*, *Serpentine*, *Hydrotalcite*, *Mica*.

235. **Hercynite.** Isometric; iron aluminate, FeAl_2O_4 .

236. **Gahnite.** Isometric; zinc aluminate, ZnAl_2O_4 .

VARIETIES:—1. *Automolite*, 2. *Dysluite*, 3. *Kreittonnite*.

237. **Magnetite.** Isometric; iron sesquioxide and iron protoxide, $\text{FeO} \cdot \text{Fe}_2\text{O}_3$.

VARIETIES:—

- | | | |
|-------------------------|---------------------------|-----------------------------|
| 1. <i>Ordinary</i> :— | (d) <i>Lodestone</i> . | 5. <i>Manganmagnetite</i> , |
| (a) <i>Crystals</i> , | 2. <i>Magnesian</i> , | 6. <i>Ocherous</i> . |
| (b) <i>Massive</i> , | 3. <i>Niccoliferous</i> , | |
| (c) <i>Loose sand</i> , | 4. <i>Titaniferous</i> , | |

RELATED:—*Nickel Oxide*.

238. **Magnesianferrite.** Isometric; magnesium ferrate, $\text{MgO} \cdot \text{Fe}_2\text{O}_3$.

239. **Franklinite.** Isometric; an iron, zinc and manganese ferrate and manganate, $(\text{Fe}, \text{Zn}, \text{Mn})\text{O} \cdot (\text{Fe}, \text{Mn})_2\text{O}_3$.

240. **Jacobsite.** Isometric; a manganese and magnesium ferrate and manganate, $(\text{Mn}, \text{Mg})\text{O} \cdot (\text{Fe}, \text{Mn})_2\text{O}_3$.

241. **Chromite.** Isometric; iron chromate, $\text{FeO} \cdot \text{Cr}_2\text{O}_3$.

VARIETIES:—1. *Crystals*, 2. *Massive*, 3. *Chrompicotite*, 4. *Magnochromite*.RELATED:—*Irite*, *Plumboferrite*.

242. **Chrysoberyl.** Orthorhombic; beryllium aluminate, $\text{BeO} \cdot \text{Al}_2\text{O}_3$.

VARIETIES:—1. *Pale Green*, 2. *Alexandrite*, 3. *Cat's Eye*.

243. **Hausmannite.** Tetragonal; manganese sesquioxide and protoxide, $\text{MnO} \cdot \text{Mn}_2\text{O}_3$.

244. **Minium.** Pulverulent; lead plumbate, $2\text{PbO} \cdot \text{PbO}_2$.

245. **Crednerite.** Monoclinic; copper manganate, $3\text{CuO} \cdot 2\text{Mn}_2\text{O}_3$.

246. **Pseudobrookite.** Orthorhombic; an iron titanate, $2\text{Fe}_2\text{O}_3 \cdot 3\text{TiO}_2$ (?).

247. **Braunite.** Tetragonal; manganese silico-manganate, $3\text{Mn}_2\text{O}_3 \cdot \text{MnSiO}_3$.

IV. DIOXIDES. RO_2 .

RUTILE GROUP. Tetragonal.

248. **Cassiterite.** Tetragonal; tin dioxide, SnO_2 .

VARIETIES:—

1. *Crystallized*, 2. *Massive*, 3. *Wood Tin* ("Toad's-eye"), 4. *Stream Tin*.

RELATED:—*Stannite*, *Ainalite*.

249. **Polianite.** Tetragonal; manganese dioxide, MnO_2 .

250. **Rutile.** Tetragonal; titanium dioxide, TiO_2 .

VARIETIES:—

1. *Ordinary*:— 2. *Ferriferous*:— 3. *Chromiferous*.

(a) *Red Crystals*, (a) *Nigrine*,
(b) *Rutilated Quartz*, (b) *Ilmenorutile*,

RELATED:—*Iserite*.

251. **Plattnerite.** Tetragonal; lead dioxide, PbO_2 .

252. **Octahedrite.** Tetragonal; titanium dioxide, TiO_2 .

253. **Brookite.** Orthorhombic; titanium dioxide, TiO_2 .

VARIETIES:—1. *Ordinary*, *Tabular*, 2. *Arkansite*.

ALTERS TO:—*Rutile*.

RELATED:—*Eumanite*.

254. **Pyrolusite.** Orthorhombic; manganese dioxide, MnO_2 .

B. HYDROUS OXIDES.

255. **Turgite.** Fibrous; hydrous iron sesquioxide, $2\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$.

DIASPORE GROUP. $\text{R}_2\text{O}_3 \cdot \text{H}_2\text{O}$.

256. **Diaspore.** Orthorhombic; hydrous aluminium sesquioxide, $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$.

257. **Göthite.** Orthorhombic; hydrous iron sesquioxide, $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$.

VARIETIES:—

1. *Thin tabular*, 3. *Columnar or fibrous*, 5. *Compact massive*,
2. *Capillary*, 4. *Scaly-fibrous*, 6. *Disseminated crystals*.

258. **Manganite.** Orthorhombic; hydrous manganese sesquioxide, $\text{Mn}_2\text{O}_3 \cdot \text{H}_2\text{O}$.

ALTERS TO:—*Pyrolusite*, *Hausmannite*, *Braunite*.

259. **Limonite.** Massive; hydrous iron sesquioxide, $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.

VARIETIES:—1. *Compact*, 2. *Ocherous*, 3. *Bog Ore*, 4. *Brown Clay-ironstone*.

ALTERS TO:—*Siderite*, *Hematite*.

260. **Xanthosiderite.** Acicular; hydrous iron sesquioxide, $\text{Fe}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$.

RELATED:—*Limnite*.

261. **Bauxite.** Massive; a hydrous aluminium sesquioxide, $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$.

VARIETIES:—1. *Oolitic*, 2. *Clay-like*.

BRUCITE GROUP.— $\text{R}(\text{OH})_2$. Rhombohedral.

262. **Brucite.** Rhombohedral; magnesium hydrate, $\text{MgO} \cdot \text{H}_2\text{O}$.

VARIETIES:—1. *Ordinary*, 2. *Nematite*, 3. *Manganbrucite*.

ALTERS TO:—*Hydromagnesite*, *Serpentine*.

RELATED:—*Eisenbrucite*.

263. **Pyrochroite.** Rhombohedral; manganese hydrate, $\text{MnO} \cdot \text{H}_2\text{O}$.

264. **Gibbsite.** Monoclinic; aluminium hydrate, $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.

RELATED:—*Richmondite*, *Zirlite*.

265. **Sassolite.** Triclinic; boric acid, $\text{B}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.

266. **Hydrotalcite.** Hexagonal; a hydrous aluminium and magnesium oxide, $\text{Al}_2\text{O}_3 \cdot 6\text{MgO} \cdot 15\text{H}_2\text{O}$ (?).

RELATED:—*Houghite*.

267. **Pyroaurite.** Hexagonal; a hydrous magnesium and iron oxide, $\text{Fe}_2\text{O}_3 \cdot 6\text{MgO} \cdot 15\text{H}_2\text{O} (?)$.
 268. **Chalcophanite.** Rhombohedral; a hydrated manganese and zinc protoxide and manganese dioxide, $(\text{MnZn})\text{O} \cdot 2\text{MnO}_2 \cdot 2\text{H}_2\text{O}$.
 269. **Psilomelane.** Massive; a hydrous manganese manganate, $\text{H}_4\text{MnO}_5 (?)$.

RELATED :—

- | | | |
|----------------------------|------------------------|---------------------------|
| 1. <i>Wad</i> :— | (b) <i>Asbolite</i> , | 2. <i>Lithiophorite</i> , |
| (a) <i>Bog Manganese</i> , | (c) <i>Lampadite</i> . | 3. <i>Varvicite</i> . |

APPENDIX TO OXIDES.

<i>Bernonite</i> ,	<i>Hydrated Titanic Oxide</i> ,	<i>Rabdionite</i> ,
<i>Delafossite</i> ,	<i>Hydrofranklinite</i> ,	<i>Transvaalite</i> ,
<i>Hetaerolite</i> ,	<i>Hydroplumbite</i> ,	<i>Winklerite</i> .
<i>Heterogenite</i> ,	<i>Namaqualite</i> ,	
<i>Heubachite</i> ,	<i>Pelagite</i> ,	

VI. OXYGEN-SALTS.

1. Carbonates.

A. ANHYDROUS CARBONATES.

1. CALCITE GROUP. RCO_3 . Rhombohedral.

270. **Calcite.** Rhombohedral; calcium carbonate, CaCO_3 .

A. VARIETIES BASED ON CRYSTALLIZATION AND IMPURITIES.

- | | | |
|------------------------------------|----------------------------------|-------------------------------------|
| I. <i>Ordinary</i> :— | (f) <i>Bardiglio</i> , | (p) <i>Lithographic stone</i> , |
| (a) <i>Dog-tooth Spar</i> , | (g) <i>Turquoise-blue</i> , | (q) <i>Breccia marble</i> , |
| (b) <i>Nail-head Spar</i> , | (h) <i>Verd-Antique</i> . | (r) <i>Pudding stone</i> , |
| (c) <i>Iceland Spar</i> , | 2. <i>Hard compact limestone</i> | (s) <i>Hydraulic lime</i> |
| (d) <i>Brunnerite</i> , | (marbles) :— | stone. |
| (e) <i>Reichite</i> , | (a) <i>Black</i> , | 3. <i>Soft compact limestone</i> :— |
| (f) <i>Fontainebleau lime-</i> | (b) <i>Yellow</i> , | (a) <i>Chalk</i> , |
| stone, | (c) <i>Red</i> , | (b) <i>Calcareous marl</i> . |
| (g) <i>Hispelite</i> . | (d) <i>Fetid</i> , | 4. <i>Concretionary massive</i> :— |
| II. <i>Fibrous and lamellar</i> :— | (e) <i>Panno-di-Morte</i> , | (a) <i>Oolite</i> , |
| (a) <i>Satin Spar</i> , | (f) <i>Marble of Lang-</i> | (b) <i>Pisolite</i> . |
| (b) <i>Argentine</i> , | uedoc, | 5. <i>Deposited by calcareous</i> |
| (c) <i>Aphrite</i> . | (g) <i>Griotte</i> , | waters :— |
| III. <i>Granular massive to</i> | (h) <i>Sarencoquin</i> , | (a) <i>Stalactites</i> , |
| <i>cryptocrystalline</i> . | (i) <i>Bird's-eye</i> , | (b) <i>Stalagmite</i> , |
| 1. <i>Granular limestone</i> :— | (k) <i>Shell-marble</i> , | (c) <i>Mexican onyx</i> , |
| (a) <i>Statuary marble</i> , | (l) <i>Madreporic mar-</i> | (d) <i>Travertine</i> , |
| (b) <i>Cipolin</i> , | ble, | (e) <i>Calc tufa</i> , |
| (c) <i>Giallo antico</i> , | (m) <i>Encrinal</i> , | (f) <i>Agaric mineral</i> , |
| (d) <i>Siena</i> , | (n) <i>Lumachelle</i> , | (g) <i>Rock-meal</i> . |
| (e) <i>Mandelato</i> , | (o) <i>Ruin-marble</i> , | |

B. VARIETIES BASED UPON COMPOSITION :—

- | | | |
|-------------------------------|----------------------------|---------------------------|
| 1. <i>Dolomitic calcite</i> , | 4. <i>Ferrocaltite</i> , | 7. <i>Plumbocalcite</i> . |
| 2. <i>Baricalcite</i> , | 5. <i>Manganocalcite</i> , | |
| 3. <i>Strontianocalcite</i> , | 6. <i>Zincocalcite</i> , | |

ALTERS TO :—Dolomite, Calamine, Siderite, Malachite, Azurite, Gypsum, Smithsonite, Barite, Fluorite, Limonite, Göthite, Hematite, Minium, Meerschau, Chlorite, Quartz, Chalcedony, Garnet, Feldspar, Mica, Pyrolusite, Hausmannite, Manganite, Marcasite, Galena, Sphalerite, Native copper.

RELATED :—*Thinolite*, *Predazzite*, *Pencatite*.

271. Dolomite. Rhombohedral; calcium and magnesium carbonate, $\text{CaCO}_3.\text{MgCO}_3$.

STRUCTURAL VARIETIES :—

- | | |
|--|------------------------------------|
| (a) <i>Crystallized (Pearl Spar)</i> , | (d) <i>Compact massive</i> , |
| (b) <i>Columnar</i> , | (e) <i>Compact porcellaneous</i> , |
| (c) <i>Granular</i> , | |

VARIETIES DEPENDING ON COMPOSITION :—

- | | | |
|-----------------------------|---------------------------|-------------------------|
| 1. <i>Normal Dolomite</i> , | 3. <i>Manganiferous</i> , | 5. <i>Zinciferous</i> . |
| 2. <i>Brown Spar</i> , | 4. <i>Cobaltiferous</i> , | |
- ALTERS TO :—Siderite, Calamine, Steatite, Limonite, Hematite, Göthite, Pyrolusite, Quartz.

271A. Ankerite. Rhombohedral; calcium, magnesium, iron and manganese carbonates, $\text{CaCO}_3(\text{Mg}, \text{Fe}, \text{Mn})\text{CO}_3$.

272. Magnesite. Rhombohedral; magnesium carbonate, MgCO_3 .

VARIETIES :—

1. *Ordinary* :—
- | | | |
|---------------------------|----------------------------|---------------------------------------|
| (a) <i>Crystallized</i> , | (c) <i>Fine granular</i> , | (e) <i>Earthy</i> . |
| (b) <i>Lamellar</i> , | (d) <i>Compact</i> , | 2. <i>Ferriferous (Breunnerite)</i> . |

272A. Mesitite. Rhombohedral; magnesium and iron carbonate, $2\text{MgCO}_3.\text{FeCO}_3$.

VARIETIES :—1. *Mesitite*, 2. *Pistomesite*.

273. Siderite. Rhombohedral; iron protocarbonate, FeCO_3 .

VARIETIES :—

1. *Ordinary* :—
- | | |
|--|---------------------------------------|
| (a) <i>Crystallized</i> , | (e) <i>Earthy</i> . |
| (b) <i>Concretionary (Sphaerosiderite)</i> , | 2. <i>Manganiferous (oligonite)</i> , |
| (c) <i>Granular to compact</i> , | 3. <i>Magnesian (sideroplesite)</i> , |
| (d) <i>Oolitic</i> , | 4. <i>Calciferous (siderodot)</i> . |

ALTERS TO :—Limonite, Hematite, Magnetite, Quartz.

RELATED :—*Thomäite (?)*.

274. Rhodochrosite. Rhombohedral; manganese protocarbonate, MnCO_3 .

VARIETIES :—

- | | |
|-------------------------|--|
| 1. <i>Ordinary</i> , | 3. <i>Calciferous (Manganocalcite)</i> , |
| 2. <i>Ferriferous</i> , | 4. <i>Zinciferous</i> . |

ALTERS TO :—Quartz.

275. Smithsonite. Rhombohedral; zinc carbonate, ZnCO_3 .

VARIETIES :—

- | | | |
|---------------------------|----------------------------------|-------------------------------------|
| 1. <i>Ordinary</i> :— | (c) <i>Granular to compact</i> , | 3. <i>Manganiferous</i> , |
| (a) <i>Crystallized</i> , | (d) <i>Earthy</i> , | 4. <i>Cupriferous (Herrerite)</i> . |
| (b) <i>Botryoidal</i> , | 2. <i>Ferriferous</i> , | |

ALTERS TO :—Calamine, Quartz, Limonite, Göthite.

RELATED :—*Orthorhombic zinc carbonate (?)*.

276. Sphaerocobaltite. Rhombohedral; cobalt protocarbonate, CoCO_3 .

2. ARAGONITE GROUP. RCO_3 . Orthorhombic.

277. Aragonite. Orthorhombic; calcium carbonate, CaCO_3 .

VARIETIES :—

- | | | |
|---------------------------|---------------------------|--------------------------|
| 1. <i>Ordinary</i> :— | (c) <i>Massive</i> . | 4. <i>Stalactitic</i> , |
| (a) <i>Crystallized</i> , | 2. <i>Mossottite</i> , | 5. <i>Coralloidal</i> , |
| (b) <i>Columnar</i> , | 3. <i>Scaly massive</i> , | 6. <i>Tarnowitzite</i> . |

ALTERS TO :—Copper, Calcite.

278. Bromlite. Orthorhombic; barium and calcium carbonate, $\text{BaCO}_3.\text{CaCO}_3$.

279. Witherite. Orthorhombic; barium carbonate, BaCO_3 .

ALTERS TO :—Barite.

280. Strontianite. Orthorhombic; strontium carbonate, SrCO_3 .

ALTERS TO :—Celestite.

281. Cerussite. Orthorhombic; lead carbonate, PbCO_3 .

ALTERS TO :—Pyromorphite, Minium, Galena.

3. BARYTOCALCITE GROUP. Monoclinic.

282. **Barytocalcite.** Monoclinic; barium and calcium carbonate, $\text{BaCO}_3 \cdot \text{CaCO}_3$.283. **Bismutosphärite.** Spherical; bismuth carbonate, Bi_2CO_5 .

4. PARISITE GROUP. Hexagonal.

284. **Parisite.** Hexagonal; a fluocarbonate of the cerium metals, $(\text{CaF})(\text{CeF})\text{Ce}(\text{CO}_3)_3(?)$.RELATED:—*Kischitmité*.285. **Bastnasite.** Massive; a fluocarbonate of the cerium metals, $(\text{Ce}, \text{La}, \text{Di})_2\text{C}_3\text{O}_9$.RELATED:—*Weibyeite*.

5. PHOSGENITE GROUP. Chlorocarbonate. Tetragonal.

286. **Phosgenite.** Tetragonal; lead chlorocarbonate, $\text{PbCO}_3 \cdot \text{PbCl}_2$.

ALTERS TO:—Lead carbonate.

B. ACID, BASIC AND HYDROUS CARBONATES.

287. **Teschemacherite.** Orthorhombic; acid ammonium carbonate, $(\text{NH}_4)_2\text{CO}_3 \cdot \text{H}_2\text{CO}_3$.RELATED:—*Kalicine*.288. **Malachite.** Monoclinic; basic cupric carbonate, $2\text{CuO} \cdot \text{CO}_2 \cdot \text{H}_2\text{O}$.RELATED:—*Lime-malachite*, *Mysorin*.289. **Azurite.** Monoclinic; basic cupric carbonate, $3\text{CuO} \cdot \text{CO}_2 \cdot \text{H}_2\text{O}$.ALTERS TO:—*Malachite*, *Native copper*.RELATED:—*Atlasite*, *Zinkazurite*.290. **Aurichalcite.** Monoclinic(?); basic zinc and copper carbonate, $2(\text{Zn}, \text{Cu})\text{CO}_3 \cdot 3(\text{Zn}, \text{Cu})(\text{OH})_2$.291. **Hydrozincite.** Massive; a basic zinc carbonate, $3\text{ZnO} \cdot \text{CO}_2 \cdot 2\text{H}_2\text{O}(?)$.292. **Hydrocerussite.** Hexagonal; a basic lead carbonate, $3\text{PbO} \cdot 2\text{CO}_2 \cdot \text{H}_2\text{O}(?)$.293. **Dawsonite.** Monoclinic(?); basic aluminium and sodium carbonate, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{CO}_2 \cdot 2\text{H}_2\text{O}$.RELATED:—*Hovite*.294. **Thermonatrite.** Orthorhombic; hydrous sodium carbonate, $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$.295. **Nesquehonite.** Orthorhombic; hydrous magnesium carbonate, $\text{MgCO}_3 + 3\text{H}_2\text{O}$.296. **Natron.** Monoclinic; hydrous sodium carbonate, $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O}$.297. **Gay-lussite.** Monoclinic; hydrous calcium and sodium carbonate, $\text{CaCO}_3 \cdot \text{Na}_2\text{CO}_3 + 5\text{H}_2\text{O}$.298. **Lanthanite.** Orthorhombic; hydrous lanthanum carbonate, $\text{La}_2(\text{CO}_3)_3 + 9\text{H}_2\text{O}$.RELATED:—*Hydroconite*.299. **Trona.** Monoclinic; hydrous sodium carbonate and bicarbonate, $\text{Na}_2\text{CO}_3 \cdot \text{HNaCO}_3 + 2\text{H}_2\text{O}$.300. **Hydromagnesite.** Monoclinic(?); basic magnesium carbonate, $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 + 3\text{H}_2\text{O}$.301. **Hydrogiobertite.** Spherical; hydrous basic magnesium carbonate, $\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 + 2\text{H}_2\text{O}$.302. **Lansfordite.** Triclinic; hydrous basic magnesium carbonate, $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 + 21\text{H}_2\text{O}$.RELATED:—*Hydrodolomite*, *Hibbertite*.303. **Zaratite.** Massive; hydrous basic nickel carbonate, $3\text{NiO} \cdot \text{CO}_2 \cdot 6\text{H}_2\text{O}$.304. **Remingtonite.** Incrusting; a hydrous cobalt carbonate.305. **Tengerite.** Pulverulent; an yttrium carbonate(?).306. **Bismutite.** Incrusting; a basic bismuth carbonate, $\text{Bi}_2\text{O}_3 \cdot \text{CO}_2 \cdot \text{H}_2\text{O}(?)$.RELATED:—*Walthelite*, *Agnosite*.307. **Uranothallite.** Orthorhombic; hydrous uranium and calcium carbonate, $2\text{CaCO}_3 \cdot \text{U}(\text{CO}_3)_2 \cdot 10\text{H}_2\text{O}$.308. **Liebigite.** Coatings; a hydrous uranium and calcium carbonate, $\text{CaCO}_3 \cdot (\text{UO}_2)_2\text{CO}_3 \cdot 20\text{H}_2\text{O}$.309. **Voglite.** Scales; a hydrous uranium, calcium and copper carbonate.RELATED:—*Schröckingerite*, *Selbite*, *Randite*.

2. Silicates.

A. ANHYDROUS SILICATES.

I. DISILICATES, RSi_2O_5 . POLYSILICATES, RSi_3O_8 .

PETALITE GROUP.

310. Petalite. Monoclinic; lithium and aluminium disilicate, $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 8\text{SiO}_2$.

VARIETIES:—1. *Ordinary*, 2. *Castorite*.

RELATED:—*Hydrocastorite*.

311. Milarite. Hexagonal; aluminium, calcium and potassium disilicate, $\text{H}_2\text{O} \cdot \text{K}_2\text{O} \cdot 4\text{CaO} \cdot 2\text{Al}_2\text{O}_3 \cdot 24\text{SiO}_2$.

312. Eudidymite. Monoclinic; sodium and beryllium polysilicate, $\text{H}_2\text{O} \cdot \text{Na}_2\text{O} \cdot 2\text{BeO} \cdot 6\text{SiO}_2$.

FELDSPAR GROUP.

A. MONOCLINIC SECTION.

313. Orthoclase. Monoclinic; aluminium and potassium polysilicate, $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES:—

- | | | |
|-------------------------------|------------------------|----------------------------|
| 1. <i>Adularia</i> , | 5. <i>Compact</i> , | 9. <i>Necronite</i> , |
| 2. <i>Sanidine</i> , | 6. <i>Leelite</i> , | 10. <i>Lazurfeldspar</i> , |
| 3. <i>Ordinary Crystals</i> , | 7. <i>Loxoclase</i> , | 11. <i>Murchisonite</i> , |
| 4. <i>Cleavable</i> , | 8. <i>Paradoxite</i> , | 12. <i>Weissigite</i> . |

ALTERS TO:—*Steatite*, *Talc*, *Chlorite*, *Kaolin*, *Lithomarge*, *Mica*, *Laumontite*, *Cassiterite*, *Calcite*.

RELATED:—*Perthite*, *Krablite*.

314. Hyalophane. Monoclinic; an aluminium, barium and potassium silicate, $\text{K}_2\text{O} \cdot \text{BaO} \cdot 2\text{Al}_2\text{O}_3 \cdot 8\text{SiO}_2$.

B. TRICLINIC SECTION.

315. Microcline. Triclinic; aluminium and potassium polysilicate, $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES:—1. *Ordinary*, 2. *Moonstone*, 3. *Amazon stone*, 4. *Chesterlite*.

315A. Anorthoclase. Triclinic; essentially a sodium and potassium polysilicate, $(\text{NaK})\text{Al}_2\text{Si}_3\text{O}_8$.

ALBITE—ANORTHITE SERIES.

316. Albite. Triclinic; aluminium and sodium polysilicate, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES:—

- | | | |
|-------------------------|---------------------------------|---------------------------|
| 1. <i>Crystals</i> , | 5. <i>Aventurine Feldspar</i> , | 9. <i>Cleavelandite</i> , |
| 2. <i>Cleavable</i> , | 6. <i>Moonstone</i> , | 10. <i>Olafite</i> , |
| 3. <i>Massive</i> , | 7. <i>Pericline</i> , | 11. <i>Zygodite</i> , |
| 4. <i>Peristerite</i> , | 8. <i>Hyposclerite</i> , | 12. <i>Tschermakite</i> . |

NOTE.—Between the isomorphous species Albite (Ab) and Anorthite (An), are several subspecies, regarded as isomorphous mixtures of these molecules, and defined according to the ratio in which they enter.

317. Oligoclase. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_3An_1).

VARIETIES:—1. *Crystals*, 2. *Massive*, 3. *Aventurine Feldspar*.

318. Andesine. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_3An_2 to Ab_1An_1).

319. Labradorite. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_1An_1 to Ab_1An_3).

VARIETIES:—

- | | |
|--------------------------------|---|
| 1. <i>Cleavable</i> :— | (b) <i>Massive</i> , |
| (a) <i>Well crystallized</i> , | 2. <i>Compact massive (Labradorite—Felsite)</i> — |

ALTERS TO:—The Zeolites, etc.

RELATED:—*Maskelynite*.

320. Anorthite. Triclinic; aluminium and calcium poly-silicate, $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

VARIETIES :—

- | | | |
|--------------------------|--|---|
| 1. <i>Anorthite</i> , | 4. <i>Crystals</i> , | 7. <i>Lindsayite</i> , |
| 2. <i>Christianite</i> , | 5. <i>Indianite</i> (<i>granular</i>), | 8. <i>Latrobeite</i> , |
| 3. <i>Biotine</i> , | 6. <i>Lepolite</i> , | 9. <i>Tunkite</i> (<i>cleavable</i>). |
- RELATED :—*Barsowite*, *Huronite*, *Mikrothin*, *Sigterite*.

II. METASILICATES. RSiO_3 .

1. LEUCITE GROUP. Isometric.

321. Leucite. Isometric; aluminium and potassium metasilicate, $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.
ALTERS TO :—*Feldspar*, *Nephelite*, *Kaolin*, *Analcite*.

322. Pollucite. Isometric; hydrous caesium, sodium and aluminium metasilicate,
 $\text{H}_2\text{O} \cdot (\text{Cs}, \text{Na})_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 5\text{SiO}_2$.

2. PYROXENE GROUP.

a. ORTHORHOMBIC SECTION.

323. Enstatite. Orthorhombic; magnesium metasilicate, $\text{MgO} \cdot \text{SiO}_2$.

VARIETIES :—

- | | |
|--|--|
| 1. <i>Ordinary</i> (<i>light color</i>), | 3. <i>Victorite</i> , |
| 2. <i>Chladnite</i> , | 4. <i>Bronzite</i> (<i>ferriferous</i>). |
- ALTERS TO :—*Talc*, *Serpentine*.

324. Hypersthene. Orthorhombic; magnesium and iron metasilicate, $(\text{Fe}, \text{Mg})\text{O} \cdot \text{SiO}_2$.

VARIETIES :—1. *Lamellar*, 2. *Amblystegite*, 3. *Szaboite*.

RELATED :—*Diaclasite*, *Bastite*, *Phästine*, *Peckhamite*.

β. MONOCLINIC SECTION.

325. Pyroxene. Monoclinic; a normal metasilicate, mainly $\text{CaO} \cdot (\text{Fe}, \text{Mg})\text{O} \cdot 2\text{SiO}_2$.

I. VARIETIES CONTAINING LITTLE OR NO ALUMINIUM :—

- | | | |
|-----------------------------|---------------------------|---------------------------------|
| 1. <i>Diopside</i> , | 9. <i>Hedenbergite</i> , | 17. <i>Asterosite</i> , |
| 2. <i>Chrome-diopside</i> , | 10. <i>Salite</i> , | 18. <i>Coccolite</i> , |
| 3. <i>Malacolite</i> , | 11. <i>Baikalite</i> , | 19. <i>Manganhedenbergite</i> , |
| 4. <i>Alalite</i> , | 12. <i>Prothéite</i> , | 20. <i>Diallage</i> , |
| 5. <i>Mussite</i> , | 13. <i>Funkite</i> , | 21. <i>Hudsonite</i> , |
| 6. <i>Traversellite</i> , | 14. <i>Lotallite</i> , | 22. <i>Omphacite</i> , |
| 7. <i>Canaanite</i> , | 15. <i>Violan</i> , | 23. <i>Schefferite</i> , |
| 8. <i>Lavrovite</i> , | 16. <i>Anthochroite</i> , | 24. <i>Jeffersonite</i> . |

II. ALUMINOUS VARIETIES :—

- | | | |
|------------------------|---------------------------------|---------------------------|
| 1. <i>Augite</i> , | 3. <i>Fassaite</i> , | 5. <i>Alkali-augite</i> . |
| 2. <i>Leucaugite</i> , | 4. <i>Titaniferous augite</i> , | |
- ALTERS TO :—*Talc*, *Serpentine*, *Epidote*, *Mica*.

RELATED (mostly alteration products of Pyroxene) :—
Hectorite, *Pitkärantite*, *Strakonitzite*,
Monradite, *Hydrous diallage*, *Uralite*.
Picrophyll, *Pyrrallolite*,

326. Acmite (Aegirite). Monoc.; iron and sodium metasilicate, $\text{Na}_2\text{O} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SiO}_2$.
ALTERS TO :—*Analcite*.

327. Spodumene. Monoc.; aluminium and lithium metasilicate, $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.
VARIETIES :—1. *Ordinary white*, 2. *Hiddenite*.

ALTERS TO :—β *Spodumene*, *Cymatolite*, *Killinite*.

328. Jadeite. Monoclinic; sodium and aluminium metasilicate, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.

VARIETIES :—1. *Ordinary*, 2. *Chloromelanite*.

(Jade is a term applied to *Jadeite*, *Nephrite* and other species.)

329. Wollastonite. Monoclinic; calcium metasilicate, $\text{CaO} \cdot \text{SiO}_2$.

VARIETIES :—1. *Ordinary*, 2. *Edelforsite*.

330. Pectolite. Monoclinic; a sodium and calcium metasilicate, $\text{H}_2\text{O} \cdot \text{Na}_2\text{O} \cdot 4\text{CaO} \cdot 6\text{SiO}_2$.

VARIETIES:—1. *Osmelite*, 2. *Walkerite*, 3. *Compact*, 4. *Manganpectolite*.

331. Rosenbuschite. Monoclinic; calcium and sodium metasilicate, with some zirconium, titanium and fluorine, $6\text{CaSiO}_3 \cdot 2\text{Na}_2\text{ZrO}_2 \cdot \text{F}_2 \cdot (\text{TiSiO}_3\text{TiO}_3)$.

332. Lavenite. Monoclinic; a manganese, iron, calcium and sodium metasilicate, with zirconium and titanium partly replacing the silicon, $(\text{Na}_4, \text{Ca}_2, \text{Mn}_2, \text{Zr})([\text{Si}, \text{Zr}]_2\text{O}_3)_2$.

333. Wöhlerite. Monoclinic; a calcium and sodium metasilicate, zirconate and niobate, $12(\text{Na}_2, \text{Ca})(\text{Si}, \text{Zr})\text{O}_3 \cdot (\text{Na}_2\text{Ca})\text{Nb}_2\text{O}_6$.

γ. TRICLINIC SECTION.

334. Hiortdahlite. Triclinic; a sodium and calcium metasilicate and zirconate, $(\text{Na}_2, \text{Ca})(\text{Si}, \text{Zr})\text{O}_3$.

335. Rhodonite. Triclinic; manganese metasilicate, $\text{MnO} \cdot \text{SiO}_2$.

VARIETIES:—

1. *Ordinary*:— (b) *Granular massive*. 3. *Bustamite*,
(a) *Paisbergite*, *Crystallized*, 2. *Ferriferous*, 4. *Fowlerite*.

ALTERS TO:—*Marceline*, *Dyssnite*, *Stratopeite*, *Allagite*, *Photocite*, *Hydro-rhodonite*, *Klipsteinite*.

336. Babingtonite. Triclinic; calcium, iron and manganese metasilicate, $(\text{Ca}, \text{Fe}, \text{Mn})\text{SiO}_3$ with $\text{Fe}_2(\text{SiO}_3)_3$.

3. AMPHIBOLE GROUP.

a. ORTHORHOMBIC SECTION.

337. Anthophyllite. Orthorhombic; magnesium and iron metasilicate, $(\text{Mg}, \text{Fe})\text{SiO}_3$.

VARIETIES:—1. *Ordinary*, 2. *Kupfferite*, 3. *Thalackerite*.

RELATED:—*Piddingtonite*.

β. MONOCLINIC SECTION.

338. Amphibole. Monoclinic; normal magnesium and calcium metasilicate, generally with some iron, manganese, aluminium, hydrogen, sodium and potassium.

VARIETIES:—

I. CONTAINING LITTLE OR NO ALUMINIUM.

- | | | |
|--|--|---|
| 1. <i>Tremolite</i> , calcium magnesium amphibole, | 9. <i>Mountain cork</i> , | 17. <i>Asbeferrite</i> , |
| 2. <i>Nordenskiöldite</i> , | 10. <i>Mountain wood</i> | 18. <i>Silfbergite</i> , |
| 3. <i>Raphilite</i> , | 11. <i>Byssolite</i> , | 19. <i>Hillängsite</i> , |
| 4. <i>Hexagonite</i> , | 12. <i>Smaragdite</i> , | 20. <i>Grünerite</i> , iron amphibole, |
| 5. <i>Actinolite</i> , calcium magnesium-iron amphibole, | 13. <i>Uralite</i> , | 21. <i>Richterite</i> , sodium-magnesium-manganese amphibole, |
| 6. <i>Nephrite</i> , | 14. <i>Cummingtonite</i> , iron-magnesium amphibole, | 22. <i>Marmairolite</i> , |
| 7. <i>Asbestos</i> , | 15. <i>Antholite</i> , | 23. <i>Breislakite</i> . |
| 8. <i>Mountain leather</i> , | 16. <i>Dannemorite</i> , iron-manganese amphibole, | |

II. ALUMINOUS:—

- | | | |
|--|--------------------------------------|--------------------------|
| 1. <i>Edenite</i> , aluminous magnesium calcium amphibole, | 4. <i>Common Black Horn-blende</i> , | 8. <i>Syntagmatite</i> , |
| 2. <i>Koksharovite</i> , | 5. <i>Noralite</i> , | 9. <i>Bergamaskite</i> |
| 3. <i>Pargasite</i> , | 6. <i>Gamsigradite</i> , | 10. <i>Kaersutite</i> . |
| | 7. <i>Diastatite</i> , | |

ALTERS TO:—*Magnesia-mica*, *Chlorite*, *Iron-ocher*, *Talc*, *Steatite*, *Serpentine*, *Epidote*, *Biotite*, *Pinite*, *Chabazite*, *Limonite*, *Magnetite*.

RELATED:—*Kirwanite*, *Loganite*, *Paligorskite*, *Phaactinite*, *Waldheimite*.

339. Glaucophane. Monoclinic; sodium, aluminium, iron and magnesium metasilicate, $\text{NaAl}(\text{SiO}_3)_2 \cdot (\text{Fe}, \text{Mg})\text{SiO}_3$.

340. Riebeckite. Monoclinic; sodium, ferrous and ferric iron metasilicate, $2\text{Na}^{\text{III}}\text{Fe}(\text{SiO}_3)_2\cdot\text{FeSiO}_3$.

341. Crocidolite. Fibrous; sodium, ferrous and ferric iron metasilicate, $\text{NaFe}^{\text{III}}(\text{SiO}_3)_2\cdot\text{FeSiO}_3$.

ALTERS TO:—Quartz and called "Tiger Eye."

342. Arfvedsonite. Monoclinic; slightly basic sodium, calcium and ferrous iron metasilicate, $4\text{Na}_2\text{O}\cdot 3\text{CaO}\cdot 14\text{FeO}\cdot (\text{Al},\text{Fe})_2\text{O}_3\cdot 21\text{SiO}_2$.

RELATED:—342 A. *Barkevikite*, *Pterolite*.

7. TRICLINIC SECTION.

343. Ænigmatite. Triclinic; sodium and ferrous iron titano-silicates, with some aluminium and ferric iron.

VARIETIES:—1. *Ordinary crystals*, 2. *Cossyrite*.

4. BERYL GROUP. Hexagonal.

344. Beryl. Hexagonal; beryllium and aluminium metasilicates, $3\text{BeO}\cdot\text{Al}_2\text{O}_3\cdot 6\text{SiO}_2$.

VARIETIES:—

- | | | |
|-------------------------|------------------------------|------------------------------|
| 1. <i>Emerald</i> , | (c) <i>Apple-green</i> , | (g) <i>Sky-blue</i> , |
| 2. <i>Ordinary</i> :— | (d) <i>Yellow (golden</i> | (h) <i>Violet</i> , |
| (a) <i>Colorless</i> , | beryl), | (i) <i>Brownish yellow</i> . |
| (b) <i>Bluish-green</i> | (e) <i>Yellowish-green</i> , | 3. <i>Davidsonite</i> , |
| (aquamarine), | (f) <i>Sapphire-blue</i> , | 4. <i>Goshenite</i> . |

RELATED:—*Rosterite*, *Pseudosmaragd*.

ALTERS TO:—Kaolin, Mica, Limonite, Quartz.

5. EUDIALYTE GROUP.

345. Eudialyte. Rhombohedral; sodium, potassium, calcium, iron, manganese metasilicate, with some cerium hydrate and zirconium oxychloride.

VARIETIES:—1. *Ordinary*, 2. *Eucolite*.

346. Catapleiite. Hexagonal (?); a sodium and calcium metasilicate and zirconate, $\text{H}_2(\text{Na}_2,\text{Ca})(\text{Zr}(\text{OH})_2)(\text{SiO}_3)_3$.

VARIETIES:—1. *Ordinary*, 2. *Natron-catapleiite*.

ALTERS TO:—Zircon.

6. MELANOCERITE GROUP.

347. Cappelenite. Hexagonal; an yttrium and barium boro-silicate, with sodium, potassium, calcium, and various rare earths.

348. Melanocerite. Rhombohedral; cerium, yttrium and calcium fluo-silicate, with some boron, tantalum, etc.

349. Caryocerite. Rhombohedral; near melanocerite, but containing more thorium.

RELATED:—*Steenstrupine*.

350. Tritomite. Rhombohedral; thorium, cerium, yttrium and calcium fluo-silicate, with some boron.

RELATED:—*Erdmannite*.

II. INTERMEDIATE SILICATES.

1. LEUCOPHANITE GROUP.

351. Leucophanite. Orthorhombic; sodium, beryllium and calcium fluo-silicate, $\text{Na}(\text{BeF})\text{Ca}(\text{SiO}_3)_2$.

352. Meliphanite. Tetragonal; beryllium, calcium and sodium fluo-silicate, $\text{NaCa}_2\text{Be}_2\text{FSi}_3\text{O}_{10}$.

2. IOLITE GROUP.

353. Iolite. Orthorhombic; a magnesium, iron and aluminium silicate, $\text{H}_2\text{O}\cdot 4(\text{Mg},\text{FeO})\cdot 4\text{Al}_2\text{O}_3\cdot 10\text{SiO}_2$.

VARIETIES:—1. *Ordinary*, 2. *Cerasite*.

ALTERS TO:—Fahlnite, Auralite, Chlorophyllite, Aspasiolite.

3. BARYSILITE GROUP.

354. **Barysilite.** Hexagonal; lead silicate, $3\text{PbO} \cdot 2\text{SiO}_2$.

355. **Ganomalite.** Tetragonal; lead, manganese and calcium silicate, $3\text{PbO} \cdot 2(\text{Ca}, \text{Mn})\text{O} \cdot 3\text{SiO}_2$.

356. **Hyalotekite.** Massive; a lead, barium and calcium boro-silicate.

III. ORTHOSILICATES. R_2SiO_4 .

1. NEPHELITE GROUP. Hexagonal.

357. **Nephelite.** Hexagonal; a sodium, potassium and aluminium orthosilicate, $3\text{Na}_2\text{O} \cdot \text{K}_2\text{O} \cdot 4\text{Al}_2\text{O}_3 \cdot 9\text{SiO}_2$.

VARIETIES:—1. *Glassy nephelite*, 2. *Elxolite*.

ALTERS TO:—Thomsonite, Analcite, Liebenerrite, Gieseckite, Dysyntribite.

358. **Eucryptite.** Hex.; lithium and aluminium orthosilicate, $\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

359. **Kaliophilite.** Hexagonal; potassium and aluminium orthosilicate, $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

360. **Cancrinite.** Hexagonal; a calcium, sodium and aluminium orthosilicate with sodium carbonate, $3\text{H}_2\text{O} \cdot 4\text{Na}_2\text{O} \cdot \text{CaO} \cdot 4\text{Al}_2\text{O}_3 \cdot 9\text{SiO}_2 \cdot 2\text{CO}_2$.

RELATED:—*Kalk-cancrinite*.

361. **Microsommitte.** Hexagonal; a sodium, potassium, calcium and aluminium sulpho-chlor orthosilicate (?).

RELATED:—*Davyne*, *Cavolinite*.

2. SODALITE GROUP. Isometric.

362. **Sodalite.** Isom.; sodium and aluminium chloro-silicate, $\text{Na}_4(\text{AlCl})\text{Al}_2\text{Si}_3\text{O}_{12}$.

ALTERS TO:—Kaolin, Thomsonite, Hydronephelite, Muscovite, Natrolite, Diaspore.

363. **Haüynite.** Isometric; sodium, calcium and aluminium orthosilicate with some sodium sulphate, $\text{Na}_2\text{Ca}(\text{NaSO}_4 \cdot \text{Al})\text{Al}_2\text{Si}_3\text{O}_{12}$.

364. **Noselite.** Isometric; sodium and aluminium silicate and sodium sulphate, $\text{Na}_4(\text{NaSO}_4 \cdot \text{Al})\text{Al}_2\text{Si}_3\text{O}_{12}$.

RELATED:—*Ittnerite*.

365. **Lazurite.** Isometric; sodium and aluminium orthosilicate and sodium sulphide, $\text{Na}_4(\text{NaS}_3 \cdot \text{Al})\text{Al}_2\text{Si}_3\text{O}_{12}$.

3. HELVITE GROUP.

366. **Helvite.** Isometric; beryllium, manganese, and iron sulpho-silicate, $(\text{Be}, \text{MnFe})_7\text{Si}_3\text{O}_{12}\text{S}$.

RELATED:—*Achtardagdit*.

367. **Danalite.** Isometric; beryllium, iron, zinc and manganese sulpho-silicate, $(\text{Fe}, \text{Zn}, \text{Mn})_2((\text{ZnFe})_2\text{S})\text{Be}_3\text{Si}_3\text{O}_{12}$.

368. **Eulytite.** Isometric; bismuth orthosilicate, $2\text{Bi}_2\text{O}_3 \cdot 3\text{SiO}_2$.

369. **Zunyite.** Isometric; basic aluminium orthosilicate, $(\text{Al}(\text{OH}, \text{F}, \text{Cl})_2)_6\text{Al}_2\text{Si}_3\text{O}_{12}$.

4. GARNET GROUP.

370. **Garnet.** Isometric; an orthosilicate containing calcium, magnesium, ferrous iron or manganese and aluminium, ferric iron or chromium.

VARIETIES:—

I. ALUMINIUM GARNET.

A. *Grossularite*, *Calcium Aluminium Garnet*, (*Essonite* *Cinnamon Stone*, *Wiluite*).

B. *Pyrope*, *Magnesium Aluminium Garnet*, (*Precious*).

C. *Almandite*, *Iron-aluminium Garnet*, (*Precious*, *common*).

D. *Spessartite*, *Manganese Aluminium Garnet*.

II. IRON GARNET.

E. *Andradite*.

1. *Calcium-iron Garnet*,

(a) *Topazolite*, *Demantoid*,

(b) *Colophonite*,

(c) *Melanite*,

(d) *Dark green*, *Jelletite*,
Calderite,

2. *Manganesian Calcium-iron Garnet*,

(a) *Rothoffite*,

(b) *Allochroite*,

(c) *Polyadelphite*,

(d) *Aplome*.

3. *Titaniferous*,

4. *Yttriferous Calcium-iron Garnet*, (*Yttergar-*
net).

III. CHROMIUM GARNET.

F. *Uvarovite*, Calcium-chromium Garnet.

ALTERS TO:—Limonite, Magnetite, Hematite, Quartz, Epidote, Amphibole, Orthoclase, Steatite, Serpentine, Chlorite, Scapolite, Mica, Oligoclase.

RELATED:—*Trautwinit*.371. **Schorlomite**. Isometric; calcium, iron and titanium silico-titanate, $3\text{CaO} \cdot (\text{Fe}, \text{Ti})_2\text{O}_3 \cdot 3(\text{SiTi})\text{O}_2$.RELATED:—*Ivaarite*.372. **Partschinite**. Monoclinic; manganese, iron and aluminium silicate, $(\text{Mn}, \text{Fe})_3\text{Al}_2\text{Si}_3\text{O}_{12}$.373. **Agricolite**. Monoclinic; bismuth orthosilicate, $\text{Bi}_4\text{Si}_3\text{O}_{12}$.

5. CHRYSOLITE GROUP.

374. **Monticellite**. Orthorh.; magnesium and calcium orthosilicate, $\text{CaO} \cdot \text{MgO} \cdot \text{SiO}_2$.VARIETIES:—1. *Gray Crystals*, 2. *Batrachite*.

ALTERS TO:—Serpentine.

375. **Forsterite**. Orthorhombic; magnesium orthosilicate, $2\text{MgO} \cdot \text{SiO}_2$.VARIETIES:—1. *Forsterite*, 2. *Boltonite*.376. **Chrysolite**. Orthorh.; magnesium and iron orthosilicate, $2(\text{MgFe})\text{O} \cdot \text{SiO}_2$.

VARIETIES:—

- | | |
|--------------------------------|---------------------------|
| 1. <i>Precious</i> , | 3. <i>Hyalosiderite</i> , |
| 2. <i>Olivine (Ordinary)</i> , | 4. <i>Glinkite</i> . |

ALTERS TO:—Serpentine, Anthophyllite, Amphibole.

RELATED:—*Villarsite*, *Matricite*, *Ferrite*, *Hortonolite*, *Neochrysolite*, *Titan olivine*.377. **Fayalite**. Orthorhombic; ferrous iron orthosilicate, $2\text{FeO} \cdot \text{SiO}_2$.378. **Knebelite**. Orthorhombic; an iron, manganese and magnesium orthosilicate, $2(\text{Fe}, \text{Mn}, \text{Mg})\text{O} \cdot \text{SiO}_2$.VARIETIES:—1. *Ordinary*, 2. *Igelströmite*.379. **Tephroite**. Orthorhombic; manganese orthosilicate, $2\text{MnO} \cdot \text{SiO}_2$.RELATED:—*Hydrotaphroite*, *Epigenite*.379A. **Roepperite**. Orthorhombic; iron, manganese, zinc and magnesium orthosilicate, $(\text{Fe}, \text{Mn}, \text{Zn}, \text{Mg})_2\text{SiO}_4$.

6. PHENACITE GROUP.

380. **Trimerite**. Triclinic; manganese, calcium and beryllium orthosilicate, $(\text{Mn}, \text{Ca})_2\text{SiO}_4 \cdot \text{Be}_2\text{SiO}_4$.381. **Willemite**. Rhombohedral; zinc orthosilicate, $2\text{ZnO} \cdot \text{SiO}_2$.VARIETIES:—1. *Common*, 2. *Troostite*, 3. *Tephrowillemite*.382. **Phenacite**. Rhombohedral; beryllium orthosilicate, $2\text{BeO} \cdot \text{SiO}_2$.383. **Diopase**. Rhombohedral; basic copper orthosilicate, $\text{H}_2\text{O} \cdot \text{CuO} \cdot \text{SiO}_2$.384. **Friedelite**. Rhombohedral; basic manganese chloride and orthosilicate, $\text{H} \cdot (\text{MnCl})\text{Mn}_4\text{Si}_4\text{O}_{16}$.385. **Pyrosmalite**. Rhombohedral; basic iron and manganese chloride and orthosilicate, $\text{H} \cdot ((\text{Fe}, \text{Mn})\text{Cl})(\text{Fe}, \text{Mn})_4\text{Si}_4\text{O}_{16}$.

7. SCAPOLITE GROUP.

386. **Meionite**. Tetragonal; calcium and aluminium silicate, $4\text{CaO} \cdot 3\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.VARIETIES:—1. *Ordinary Crystals*, 2. *Ersbyite*.387. **Wernerite**. Tetragonal; aluminium, calcium and sodium chloro-silicate.

VARIETIES:—

- | | | |
|-------------------------------|-------------------------|--------------------------|
| 1. <i>Ordinary Crystals</i> , | 3. <i>Passauite</i> , | 5. <i>Glaucolite</i> , |
| 2. <i>Nuttallite</i> , | 4. <i>Ontariolite</i> , | 6. <i>Pink massive</i> . |

ALTERS TO:—Pinite, Epidote, Steatite, Magnesia mica, Kaolin-like compound, Silica.

388. **Mizzonite**. Tetragonal; an aluminium, sodium and calcium chloro-silicate.

VARIETIES:—

- | | | |
|----------------------|--------------------------|----------------------|
| 1. <i>Ordinary</i> , | 3. <i>Cousseranite</i> , | 5. <i>Riponite</i> . |
| 2. <i>Dipyre</i> , | 4. <i>Prehnitoid</i> , | |

389. Marialite. Tet.; sodium and aluminium chloro-silicate, $\text{Na}_4\text{Al}_3\text{Si}_3\text{O}_{24}\text{Cl}$.

ALTERED SCAPOLITES:—

<i>Atheriastite,</i>	<i>Wilsonite,</i>	<i>Pseudo-scapolite,</i>
<i>Stroganovite,</i>	<i>Terenite,</i>	<i>Paralogite.</i>
<i>Algerite,</i>	<i>Gabronite,</i>	

390. Sarcolite. Tetragonal; aluminium, calcium and sodium orthosilicate, $3(\text{Ca}-\text{Na}_2)\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2$.

8. MELILITE GROUP.

391. Melilite. Tetragonal; a sodium, calcium, magnesium, aluminium and iron silicate, $\text{Na}_2(\text{Ca}, \text{Mg})_{11}(\text{Al}, \text{Fe})_4\text{Si}_9\text{O}_{36}(\text{?})$.

RELATED:—*Akermanite.*

392. Gehlenite. Tet.; calcium and aluminium orthosilicate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

ALTERS TO:—*Steatite*, *Fassaite*, *Grossularite*.

RELATED:—*Cacoclasite.*

9. VESUVIANITE GROUP.

393. Vesuvianite. Tetragonal; a basic calcium-aluminium silicate, $\text{H}(\text{OH})_3\text{Ca}_{12}(\text{Al}, \text{Fe})_6(\text{SiO}_4)_{10}(\text{?})$.

VARIETIES:—1. *Ordinary*, 2. *Cyprine*.

ALTERS TO:—*Steatite*, *Mica*, *Clinocllore*, *Diopside*, *Garnet*.

10. ZIRCON GROUP.

394. Zircon. Tetragonal; zirconium silicate, $\text{ZrO}_2 \cdot \text{SiO}_2$.

VARIETIES:—

1. <i>Ordinary,</i>	3. <i>Hyacinth (gem),</i>	5. <i>Beccarite.</i>
2. <i>Azorite,</i>	4. <i>Jargon,</i>	

ALTERED ZIRCON:—

<i>Malakon,</i>	<i>Erstedite,</i>	<i>Cyrtolite,</i>
<i>Tachyaphaltite,</i>	<i>Auerbachite,</i>	<i>Albite.</i>

395. Thorite. Tetragonal; anhydrous thorium silicate, $\text{ThO}_2 \cdot \text{SiO}_2$.

VARIETIES:—1. *Thorite*, 2. *Orangite*, 3. *Uranothorite*.

RELATED:—*Calciorthorite*, *Eucrasite*, *Freyalite*, *Auerlite*.

11. DANBURITE—TOPAZ GROUP.

396. Danburite. Orthorhombic; calcium and boron silicate, $\text{CaO} \cdot \text{B}_2\text{O}_3 \cdot 2\text{SiO}_2$.

397. Topaz. Orthorhombic; an aluminium fluo-silicate, $(\text{Al}(\text{O}, \text{F}_2))\text{AlSiO}_4$.

VARIETIES:—1. *Crystals*, 2. *Massive*, 3. *Physalite*, 4. *Pycnite*.

ALTERS TO:—*Steatite*, *Damourite*, *Kaolin*.

398. Andalusite. Orthorhombic; aluminium silicate, $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$.

VARIETIES:—1. *Ordinary Crystals*, 2. *Chiastolite*.

ALTERS TO:—*Kaolin*, *Muscovite*, *Pinite*, *Cyanite*.

399. Sillimanite. Orthorhombic; aluminium silicate, $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$.

VARIETIES:—1. *Sillimanite*, 2. *Fibrolite*, 3. *Bamlite*, 4. *Xenolite*, 5. *Wörthite*.

RELATED:—*Glancespar*, *Westanite*.

400. Cyanite. Triclinic; aluminium silicate, $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$.

ALTERS TO:—*Talc*, *Steatite*.

12. DATOLITE GROUP.

401. Datolite. Monoclinic; a basic calcium and boron orthosilicate, $\text{H}_2\text{O} \cdot 2\text{CaO} \cdot \text{B}_2\text{O}_3 \cdot 2\text{SiO}_2$.

VARIETIES:—1. *Glassy Crystals*, 2. *Compact massive*, 3. *Botryoidal*.

ALTERS TO:—*Chalcedony* (called *Haytorite*).

402. Homilite. Monoclinic; calcium and iron boro-silicate, $2\text{CaO} \cdot \text{FeO} \cdot \text{B}_2\text{O}_3 \cdot 2\text{SiO}_2$.

RELATED:—*Erdmannite*.

403. Euclase. Monoclinic; basic beryllium and aluminium orthosilicate, $\text{H}_2\text{O} \cdot 2\text{BeO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

404. Gadolinite. Monoclinic; a beryllium, iron and yttrium orthosilicate, $2\text{BeO} \cdot \text{FeO} \cdot 2\text{Y}_2\text{O}_3 \cdot 2\text{SiO}_2$.

ALTERS TO:—*Ocher-like mineral*.

405. Yttrialite. Massive; chiefly a silicate of thorium and the yttrium metals.

RELATED:—*Yttrium silicate*.

13. EPIDOTE GROUP.

406. Zoisite. Orthorhombic; basic calcium and aluminium silicate, $4\text{CaO} \cdot 3\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot \text{H}_2\text{O}$.

VARIETIES:—1. *Ordinary*, 2. *Rose-red (Thulite)*, 3. *Compact, massive*.

RELATED:—*Saussurite*.

407. Epidote. Monoclinic; basic calcium, aluminium and iron silicate, $\text{H}_2\text{O} \cdot 4\text{CaO} \cdot 3(\text{Al}, \text{Fe})_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES:—

- | | | |
|-----------------------|-------------------------------|-----------------------|
| 1. <i>Ordinary</i> , | (c) <i>Granular massive</i> , | 3. <i>Withamite</i> , |
| (a) <i>Crystals</i> , | (d) <i>Scorza (sand)</i> , | 4. <i>Beustite</i> , |
| (b) <i>Fibrous</i> , | 2. <i>Bucklandite</i> , | 5. <i>Escherite</i> . |

RELATED:—*Picroepidote*.

408. Piedmontite. Monoclinic; basic calcium, aluminium, manganese and iron silicate, $\text{H}_2\text{O} \cdot 4\text{CaO} \cdot 3(\text{Al}, \text{Mn}, \text{Fe})_2\text{O}_3 \cdot 6\text{SiO}_2$.

409. Allanite. Monoclinic; basic calcium, iron, aluminium, cerium and yttrium metals, orthosilicate, $\text{H}_2\text{O} \cdot 4(\text{Ca}, \text{Fe})\text{O}_3(\text{Al}, \text{Fe}, \text{Ce}, \text{Di}, \text{La}, \text{Y})_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES:—

- | | | |
|-------------------------|--------------------------|--------------------------|
| 1. <i>Ordinary</i> , | 4. <i>Bagrathonite</i> , | 6. <i>Xanthorthite</i> , |
| 2. <i>Bucklandite</i> , | 5. <i>Orthite</i> , | 7. <i>Pyrrorthite</i> . |
| 3. <i>Uralorthite</i> , | | |

RELATED:—*Wasite*, *Muromontite*, *Bodenite*.

14. AXINITE GROUP.

410. Axinite. Triclinic; an aluminium and calcium boro-silicate, some iron and manganese, $\text{H}_2\text{Ca}_4(\text{BO})\text{Al}_3(\text{SiO}_4)_5(?)$.

ALTERS TO:—*Chlorite*.

ORTHOSILICATES NOT INCLUDED IN FOREGOING GROUPS.

411. Prehnite. Orthorh.; acid calcium and aluminium orthosilicate, $\text{H}_2\text{Ca}_2\text{Al}_2\text{Si}_3\text{O}_{12}$.

ALTERS TO:—*Green earth*, *Feldspar*.

RELATED:—*Ugite*, *Prehnitoid*.

412. Harstigitite. Orthorhombic; an acid manganese and calcium orthosilicate, $\text{H}_2(\text{Ca}, \text{Mn})_{12}\text{Al}_3\text{Si}_{10}\text{O}_{40}(?)$.

413. Cuspidine. Monoclinic; contains silica, calcium, fluorine and carbon dioxide; formula doubtful.

IV. SUBSILICATES.

HUMITE GROUP.

414. Humite. Orthorhombic; magnesium fluo-silicate, $\text{Mg}_{13}(\text{MgF})_4(\text{MgOH})_2\text{Si}_3\text{O}_{32}$.

415. Chondrodite. Monoclinic; magnesium fluo-silicate.

ALTERS TO:—*Serpentine*.

416. Clinohumite. Monoclinic; magnesium fluo-silicate.

417. Ilvaite. Orthorhombic; calcium and ferrous and ferric iron silicate, $\text{H}_2\text{O} \cdot \text{CaO} \cdot 4\text{FeO} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SiO}_2$.

418. Ardennite. Orthorhombic; an aluminium and manganese vanadio-silicate, $5\text{H}_2\text{O} \cdot 8\text{MnO} \cdot 4\text{Al}_2\text{O}_3 \cdot \text{V}_2\text{O}_5 \cdot 8\text{SiO}_2(?)$.

419. Langbanite. Hexagonal; manganese silicate and ferrous iron antimonate, $37\text{Mn}_3\text{SiO}_7 \cdot 10\text{Fe}_3\text{Sb}_2\text{O}_8(?)$.

KENTROLITE GROUP.

420. Kentrolite. Orthorh.; lead and manganese silicate, $2\text{PbO} \cdot \text{Mn}_2\text{O}_3 \cdot 2\text{SiO}_2(?)$.

421. Melanotekite. Massive; lead and ferric iron silicate, $2\text{PbO} \cdot \text{Fe}_2\text{O}_3 \cdot 2\text{SiO}_2$.

422. Bertrandite. Orthorhombic; basic beryllium orthosilicate, $\text{H}_2\text{O} \cdot 4\text{BeO} \cdot 2\text{SiO}_2$.

423. Calamine. Orthorhombic; basic zinc silicate, $\text{H}_2\text{O} \cdot 2\text{ZnO} \cdot \text{SiO}_2$.

VARIETIES:—

- | | | |
|--------------------------|------------------------|------------------------|
| 1. <i>Ordinary</i> :— | | |
| (a) <i>Crystals</i> , | (c) <i>Massive</i> , | 3. <i>Argillaceous</i> |
| (b) <i>Stalactitic</i> , | 2. <i>Carbonated</i> , | 4. <i>Wagite</i> . |

RELATED:—*Moresnetite*, *Vannuxemite*

- 424. Carpholite.** Monoclinic; basic manganese, aluminium metasilicate(?), $2\text{H}_2\text{O} \cdot \text{MnO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.
425. Cerite. Orthorhombic; calcium, iron and cerium silicate, $3\text{H}_2\text{O} \cdot 2(\text{Ca}, \text{Fe})\text{O} \cdot 3\text{Ce}_2\text{O}_3 \cdot 6\text{SiO}_2(?)$.
426. Tourmaline. Rhombohedral; boron, aluminium and either magnesium, iron or alkali silicate.

VARIETIES:—

I. Based on color:—

- (a) *Rubellite*,
- (b) *Indicolite*,
- (c) *Brazilian Sapphire*,
- (d) *Brazilian Emerald*,
- (e) *Peridot of Ceylon*,
- (f) *Achroïte*,
- (g) *Aphrizite*.
- (h) *Columnar and black*.

II. Based on composition:—

- (a) *Alkali Tourmaline*,
- (b) *Iron Tourmaline*,
- (c) *Magnesium Tourmaline*,
- (d) *Chromium Tourmaline*.

ALTERS TO:—Mica, Chlorite, Cookeite, Steatite.

RELATED:—*Zeuxite*.

- 427. Dumortierite.** Orthorhombic; a basic aluminium silicate, $4\text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2(?)$.
428. Staurolite. Orthorhombic; a basic iron, magnesium and aluminium silicate, $2\text{H}_2\text{O} \cdot 6(\text{Fe}, \text{Mg})\text{O} \cdot 12\text{Al}_2\text{O}_3 \cdot 11\text{SiO}_2(?)$

VARIETIES:—1. *Ordinary*, 2. *Nordmarkite*, 3. *Xantholite*.

ALTERS TO:—Steatite.

- 429. Kornerupine.** Orthorhombic; magnesium and aluminium silicate, $\text{MgO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$.

RELATED:—*Kryptotil*.

- 430. Sapphirine.** Monoc.; magnesium and aluminium silicate, $5\text{MgO} \cdot 6\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

APPENDIX TO ANHYDROUS SILICATES.

Barylite,
Hypochlorite,
Bismutoferrite,

Monzonite,
Neociano,

Ramosite,
Sphenoclase.

B. HYDROUS SILICATES.

I. ZEOLITE DIVISION.

1. INTRODUCTORY SUBDIVISION.

- 431. Inesite.** Tric.; hydrous manganese and calcium silicate, $2(\text{Mn}, \text{Ca})\text{SiO}_3 + \text{H}_2\text{O}$.
432. Ganophyllite. Monoclinic; hydrous manganese and aluminium silicate, $6\text{H}_2\text{O} \cdot 7\text{MnO} \cdot \text{Al}_2\text{O}_3 \cdot 8\text{SiO}_2$.
433. Okenite. Orthorhombic(?); hydrous calcium silicate, $2\text{H}_2\text{O} \cdot \text{CaO} \cdot 2\text{SiO}_2$.
434. Gyrolite. In concretions; hydrous calcium silicate, $3\text{H}_2\text{O} \cdot 2\text{CaO} \cdot 3\text{SiO}_2$.
435. Apophyllite. Tetragonal; hydrous potassium and calcium silicate, $\text{K}_2\text{O} \cdot 0.8\text{CaO} \cdot 16\text{SiO}_2 \cdot 16\text{H}_2\text{O}$.

VARIETIES:—

1. *Ordinary*,
2. *Oxhaverite*,

3. *Albine*,
4. *Xylochlore*,

5. *Tesselite*,
6. *Leucocyclite*.

OTHER HYDROUS CALCIUM SILICATES, NOT PERFECTLY DEFINED:—

Centrallassite,
Xonotlite,

Tobermorite,
Chalcomorphite,

Plombierite,
Louisite.

2. ZEOLITES.

MORDENITE GROUP.

- 436. Ptilolite.** Masses of minute needles; hydrous calcium, sodium, potassium and aluminium silicate, $(\text{Ca}, \text{K}_2, \text{Na}_2)\text{Al}_2\text{Si}_{10}\text{O}_{24} + 5\text{H}_2\text{O}$.
437. Mordenite. Monoclinic; hydrous calcium, sodium, potassium and aluminium silicate, $3(\text{Ca}, \text{Na}_2, \text{K}_2)\text{Al}_2\text{Si}_{10}\text{O}_{24} + 20\text{H}_2\text{O}$.
 RELATED:—*Steeleite*, *Pseudonatrolite*.

HEULANDITE GROUP. Monoclinic.

438. **Heulandite.** Monoclinic; hydrous calcium and aluminium silicate, $5\text{H}_2\text{O} \cdot \text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

RELATED :—*Oryzite*.

439. **Brewsterite.** Monoclinic; hydrous barium, strontium, calcium and aluminium silicate, $(\text{Sr}, \text{Ba}, \text{Ca})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 5\text{H}_2\text{O}$.

440. **Epistilbite.** Monoclinic; hydrous calcium and aluminium silicate, $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 5\text{H}_2\text{O}$.

PHILLIPSITE GROUP. Monoclinic.

441. **Phillipsite.** Monoclinic; hydrous potassium, calcium and aluminium silicate, generally $(\text{K}, \text{Ca})\text{Al}_2\text{Si}_4\text{O}_{12} + 4\frac{1}{2}\text{H}_2\text{O}$.

RELATED :—*Spangite*.

442. **Harmotome.** Monoclinic; hydrous potassium, barium and aluminium silicate, $(\text{K}, \text{Ba})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 5\text{SiO}_2 \cdot 5\text{H}_2\text{O}$.

443. **Stilbite.** Monoclinic; hydrous sodium, calcium and aluminium silicate, generally $(\text{Na}, \text{Ca})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 6\text{H}_2\text{O}$.

VARIETIES :—1. *Crystallized*, 2. *Radiated*, 3. *Spherical* (*Sphaerostilbite*).

ALTERS TO :—*Quartz*.

RELATED :—*Foersite*.

444. **Gismondite.** Monoclinic; hydrous calcium and aluminium silicate, with some potash, corresponds nearly to $\text{CaAl}_2\text{Si}_4\text{O}_{12} + 4\text{H}_2\text{O}$.

445. **Laumontite.** Monoclinic; hydrous calcium and aluminium silicate, $4\text{H}_2\text{O} \cdot \text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.

VARIETIES :—

1. *Ordinary*,

3. *Caporcianite*,

5. *Edelforsite*.

2. *Leonhardtite*,

4. *Schneiderite*,

ALTERS TO :—*Orthoclase*.

446. **Laubanite.** Fibrous and radiating; hydrous calcium and aluminium silicate, $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 5\text{SiO}_2 + 6\text{H}_2\text{O}$.

CHABAZITE GROUP. Rhombohedral.

447. **Chabazite.** Rhombohedral; hydrous calcium, sodium and aluminium silicate, usually corresponds to $(\text{Ca}, \text{Na})\text{Al}_2\text{Si}_4\text{O}_{12} + 6\text{H}_2\text{O}$.

VARIETIES :—

1. *Ordinary*,

(b) *Haydenite*,

(a) *Acadialite*,

2. *Phacolite* (*Herschellite* or *Seebachite*).

RELATED :—*Doromite*.

448. **Gmelinite.** Rhombohedral; hydrous sodium, calcium and aluminium silicate, $(\text{Na}, \text{Ca})\text{Al}_2\text{Si}_4\text{O}_{12} + 6\text{H}_2\text{O}$.

RELATED :—*Groddeckite*.

449. **Levynite.** Rhombohedral; hydrous calcium and aluminium silicate, $\text{CaAl}_2\text{Si}_3\text{O}_{10} + 5\text{H}_2\text{O}$.

RELATED :—*Mesolin*.

450. **Analcite.** Isometric; hydrous sodium and aluminium silicate, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot 2\text{H}_2\text{O}$.

VARIETIES :—1. *Ordinary*, 2. *Euthallite*, 3. *Eudnophite*.

ALTERS TO :—*Prehnite*, *Lithomarge*.

Cluthalite is possibly an alteration.

451. **Faujasite.** Isometric; hydrous sodium, calcium and aluminium silicate, $\text{Na}_2\text{O} \cdot \text{CaO} \cdot 2\text{Al}_2\text{O}_3 \cdot 10\text{SiO}_2 \cdot 20\text{H}_2\text{O} (?)$.

452. **Edingtonite.** Tetragonal; hydrous barium and aluminium silicate, $\text{BaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 3\text{H}_2\text{O} (?)$.

RELATED :—*Glottalite*.

NATROLITE GROUP.

453. **Natrolite.** Orthorhombic; hydrous sodium and aluminium silicate, $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 + 2\text{H}_2\text{O}$.

VARIETIES :—

1. *Ordinary* :—

(d) *Compact massive*,

(a) *Groups of slender prisms*,

2. *Fargite*,

(b) *Fibrous radiated masses*,

3. *Radiolite*,

(c) *Solid amygdules*,

4. *Bergmannite* (*Spreustein*).

RELATED :—*Ellagite*.

454. Scolecite. Monoclinic; hydrous calcium and aluminium silicate, $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 3\text{H}_2\text{O}$.

455. Mesolite. Monoclinic and triclinic; a hydrous calcium, sodium and aluminium silicate.

VARIETIES :—

- | | |
|-------------------------------------|------------------------------|
| 1. <i>Ordinary</i> , | (c) <i>White amorphous</i> , |
| (a) <i>Acicular and capillary</i> , | 2. <i>Harringtonite</i> , |
| (b) <i>Fibrous stalactites</i> , | 3. <i>Galactite</i> . |

THOMSONITE GROUP.

456. Thomsonite. Orthorhombic; hydrous sodium, calcium and aluminium silicate, $(\text{Na}_2, \text{Ca})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot \frac{1}{2}\text{H}_2\text{O}$.

VARIETIES :—

- | | |
|------------------------------------|--------------------------------|
| 1. <i>Ordinary</i> , | (e) <i>Ozarkite</i> , |
| (a) <i>Rectangular prisms</i> , | 2. <i>Mesole (Faroelite)</i> , |
| (b) <i>Slender prisms</i> , | 3. <i>Scoulerite</i> , |
| (c) <i>Radiated fibrous</i> , | 4. <i>Chalilite</i> . |
| (d) <i>Spherical concretions</i> , | |

RELATED :—*Picrothomsonite*.

457. Hydronephelite. Hexagonal(?); hydrous sodium and aluminium silicate, usually $2\text{Na}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 7\text{H}_2\text{O}$.

VARIETIES :—1. *Ordinary*, 2. *Ranite*.

APPENDIX TO ZEOLITES.

<i>Chlorastrolite</i> ,	<i>Episphärite</i> ,	<i>Sloanite</i> ,
<i>Zonochlorite</i> ,	<i>Sasbachite</i> ,	<i>Unknown Zeolite</i> .
<i>Dolianite</i> ,		

II. MICA DIVISION.

1. MICA GROUP. Monoclinic.

458. Muscovite. Monoclinic; hydrous potassium and aluminium orthosilicate. $2\text{H}_2\text{O} \cdot \text{K}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES :—

- | | | |
|--------------------------------|-----------------------------|----------------------------|
| 1. <i>Ordinary Muscovite</i> , | (e) <i>Adamsite</i> , | (k) <i>Leucophyllite</i> , |
| 2. <i>Damourite</i> , | (f) <i>Ivigit</i> , | 3. <i>Oncosine</i> , |
| (a) <i>Sterlingite</i> , | (g) <i>Sericite</i> , | (a) <i>Oncophyllite</i> , |
| (b) <i>Margarodite</i> , | (h) <i>Metasericite</i> , | (b) <i>Didymite</i> , |
| (c) <i>Gilbertite</i> , | (i) <i>Lepidomorphite</i> , | 4. <i>Fuchsite</i> , |
| (d) <i>Talcite</i> , | (j) <i>Pycnophyllite</i> , | 5. <i>Avalite</i> , |
| | | 6. <i>Oellacherite</i> . |

ALTERS TO :—*Steatite*, *Serpentine*.

Pinite is probably an impure massive variety and includes a large number of alteration products as follows :—

<i>Gigantolite</i> ,	<i>Parophite</i> ,	<i>Wilsonite</i> ,
<i>Giesbeckite</i> ,	<i>Rosite</i> ,	<i>Killinite</i> ,
<i>Lythrodite</i> ,	<i>Polyargite</i> ,	<i>Agalmatolite</i> ,
<i>Liebenerite</i> ,	<i>Pinitoid</i> ,	<i>Oosite</i> ,
<i>Dysyntribite</i> ,	<i>Hygrophilite</i> ,	<i>Cataspilite</i> .

459. Paragonite. Massive; a hydrous sodium and aluminium silicate, $2\text{H}_2\text{O} \cdot \text{Na}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$.

VARIETIES :—1. *Ordinary*, 2. *Cossaite*.

RELATED :—*Euphyllite*.

460. Lepidolite. Crystalline; a potassium, lithium and aluminium basic fluo-silicate, $\text{KLi}[\text{Al}(\text{OH}, \text{F})_2]\text{Al}(\text{SiO}_2)_3$.

RELATED :—*Cookeite*.

461. Zinnwaldite. Monoclinic; a basic potassium, lithium, iron and aluminium fluo-silicate, $(\text{K}, \text{Li})_3\text{FeAl}_3\text{Si}_6\text{O}_{16}(\text{OH}, \text{F})_2$.

VARIETIES :—1. *Ordinary*, 2. *Rabenglimmer*, 3. *Cryophyllite*, 4. *Polyolithionite*.

RELATED :—*Protolithionite*.

- 462. Biotite.** Monoclinic; potassium, magnesium, aluminium, ferrous and ferric iron orthosilicate, $(\text{H}, \text{K})_2(\text{Mg}, \text{Fe})_2(\text{AlFe})_2(\text{SiO}_4)_3$.

VARIETIES :—

- Divided into—
 I. *Merxene* Ax. pl. $\parallel b$.
 II. *Anomite* Ax. pl. $\perp b$.
 1. *Barytbiotite*,
 2. *Chromglimmer*.
 3. *Siderophyllite*,
 4. *Haughtonite*,
 5. *Manganophyllite*.

RELATED:—*Rubellan*, *Eukamptite*, *Voigtite*, *Rastolyte*, *Hydrobiotite*, *Pseudobiotite*, *Bastonite*.

- 462A. Phlogopite.** Monoclinic; potassium, magnesium and aluminium fluo-silicate, $(\text{H}, \text{K}, (\text{MgF}))_3\text{Mg}_3\text{Al}(\text{SiO}_4)_3$.

RELATED:—*Aspidolite*.

- 462B. Lepidomelane.** Hexagonal (?); potassium, aluminium, ferrous and ferric iron silicate, $(\text{H}, \text{K})_2\text{Fe}_3(\text{FeAl})_4(\text{SiO}_4)_5$.

RELATED:—*Pterolite*, *Alurgite*, *Helvetan*.

- 463. Roscoelite.** Minute scales; a basic potassium, magnesium, iron, aluminium and vanadium silicate, $\text{H}_3\text{K}(\text{Mg}, \text{Fe})(\text{Al}, \text{V})_4(\text{SiO}_3)_{12}?$.

2. CLINTONITE GROUP. Monoclinic.

- 464. Margarite.** Monoc.; basic aluminium and calcium silicate, $\text{H}_2\text{CaAl}_4\text{Si}_2\text{O}_{12}$.
 ALTERS TO:—*Dudleyite*.

- 465. Seybertite.** Monoclinic; basic magnesium, calcium and aluminium silicate, $3\text{H}_2\text{O} \cdot 10(\text{Mg}, \text{Ca})\text{O} \cdot 5\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.

VARIETIES :—1. *Clintonite*, 2. *Brandisite*.

- 465A. Xanthophyllite.** Monoclinic; a basic magnesium, calcium and aluminium silicate, $\text{H}_8(\text{Mg}, \text{Ca})_{14}\text{Al}_{16}\text{Si}_5\text{O}_{52}?$.

VARIETIES :—1. *Ordinary*, 2. *Waluerite*.

- 466. Chloritoid.** Monoclinic or triclinic; a basic iron, magnesium and aluminium silicate, $\text{H}_2(\text{Fe}, \text{Mg})\text{Al}_2\text{SiO}_7$.

VARIETIES :—1. *Ordinary*, 2. *Sismondine*, 3. *Masonite*, 4. *Salmite*.

- 467. Ottrelite.** Monoclinic or triclinic; a basic iron, manganese and aluminium silicate, $\text{H}_2(\text{Fe}, \text{Mn})\text{Al}_2\text{Si}_2\text{O}_9?$.

VARIETIES :—1. *Ordinary*, 2. *Venasquite*, 3. *Phyllite*.

3. CHLORITE GROUP. Monoclinic.

- 468. Clinochlore.** Monoclinic; basic magnesium and aluminium silicate, $4\text{H}_2\text{O} \cdot 5\text{MgO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2$.

VARIETIES :—

- | | | |
|-----------------------|-----------------------------|---------------------------|
| 1 <i>Ordinary</i> , | (c) <i>Massive</i> , | 3. <i>Kotschubeite</i> , |
| (a) <i>Crystals</i> , | 2. <i>Leuchtenbergite</i> , | 4. <i>Manganiferous</i> . |
| (b) <i>Foliated</i> , | | |

- 468A. Penninite.** Monoclinic, rhomboh. symmetry; basic magnesium, aluminium and iron silicate, $\text{H}_8(\text{Mg}, \text{Fe})_5\text{Al}_2\text{Si}_3\text{O}_{18}$.

VARIETIES :—

- | | | |
|-----------------------|-------------------------|-------------------------|
| 1. <i>Penninite</i> , | 3. <i>Kämmererite</i> , | 5. <i>Loganite</i> , |
| 2. <i>Hydrotalc</i> , | 4. <i>Rhodochrome</i> , | 6. <i>Pseudophile</i> . |

RELATED:—*Tubergite*.

- 469. Prochlorite.** Monoclinic; basic magnesium, iron and aluminium silicate.

RELATED:—*Grochauite*.

- 470. Corundophilite.** Monoclinic; a basic magnesium and aluminium silicate, $\text{H}_{20}\text{Mg}_{11}\text{Al}_8\text{Si}_5\text{O}_{45}$.

RELATED:—*Amesite*.

- 471. Daphnite.** Monoclinic; a basic iron and aluminium sil., $\text{H}_{36}\text{Fe}_{27}\text{Al}_{20}\text{Si}_{18}\text{O}_{121}$.

RELATED:—*Metachlorite*, *Klemenite*.

- 472. Cronstedtite.** Rhombohedral; a basic ferrous and ferric iron silicate, $4\text{FeO} \cdot 2\text{Fe}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 4\text{H}_2\text{O}?$.

- 473. Thuringite.** Massive; a basic aluminium, ferrous and ferric iron silicate, $8\text{FeO} \cdot 4(\text{Al}, \text{Fe})_2\text{O}_3 \cdot 6\text{SiO}_2 \cdot 9\text{H}_2\text{O}$.

RELATED:—*Chamosite*, *Berthierine*.

474. Stilpnomelane. Crystalline; a basic magnesium, aluminium, ferrous and ferric iron silicate, $2(\text{Fe}, \text{Mg})\text{O} \cdot (\text{Fe}, \text{Al})_2\text{O}_3 \cdot 5\text{SiO}_2 \cdot 3\text{H}_2\text{O} (?)$.

VARIETIES:—1. *Ordinary*, 2. *Chalcodite*.

475. Strigovite. Minute prisms; a basic aluminium, ferrous and ferric iron silicate, $2\text{FeO} \cdot (\text{Fe}, \text{Al})_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$.

476. Diabantite. Monoclinic(?); a basic ferrous iron, magnesium and aluminium silicate, $12(\text{Fe}, \text{Mg})\text{O} \cdot 2\text{Al}_2\text{O}_3 \cdot 9\text{SiO}_3 \cdot 9\text{H}_2\text{O}$.

477. Aphrosiderite. Massive; a basic aluminium, ferrous and ferric iron silicate, $\text{H}_{10}\text{Fe}_6(\text{Fe}, \text{Al})_4\text{Si}_4\text{O}_{25} (?)$.

478. Delessite. Massive; a basic magnesium, aluminium, ferrous and ferric iron silicate, $\text{H}_{10}(\text{Mg}, \text{Fe})_4(\text{Al}, \text{Fe})_4\text{Si}_4\text{O}_{23} (?)$.

RELATED:—*Subdelessite*.

479. Rumpfite. Massive; a basic aluminium and magnesium silicate, $7\text{MgO} \cdot 8\text{Al}_2\text{O}_3 \cdot 10\text{SiO}_2 \cdot 14\text{H}_2\text{O} (?)$.

OTHER CHLORITIC MINERALS, IMPERFECTLY DEFINED.

<i>Talc-chlorite of Traversella,</i>	<i>Melanolite,</i>	<i>Mineral from Altenburg,</i>
<i>Epichlorite,</i>	<i>Ekmanite,</i>	<i>Baltimorite,</i>
<i>Euralite,</i>	<i>Berlaute,</i>	<i>Dumasite,</i>
<i>Epiphanite,</i>	<i>Steatargillite,</i>	<i>Prasilite,</i>
<i>Chlorophæite,</i>	<i>Pattersonite,</i>	<i>Grasite,</i>
<i>Hullite,</i>	<i>Mineral from Webster, N. C.</i>	<i>Viridite.</i>

APPENDIX TO MICAS—VERMICULITES.

480. Jefferisite. Crystalline plates; a hydrous magnesium, aluminium, ferrous and ferric iron silicate, $\text{H}_{70}(\text{Mg}, \text{Fe})_{33}(\text{Al}, \text{Fe})_{42}\text{Si}_{57}\text{O}_{263} + 82\text{H}_2\text{O} (?)$.

VARIETIES:—1. *Ordinary*, 2. *Culsageite*, 3. *Pelhamite*.

<i>Vermiculite,</i>	<i>Painterite,</i>	<i>Dudleyite,</i>
<i>Kerrite,</i>	<i>Philadelphite,</i>	<i>Pyrosclerite,</i>
<i>Lucasite,</i>	<i>Protovermiculite,</i>	<i>Roseite,</i>
<i>Lennilite,</i>	<i>Vaalite,</i>	<i>Willcoxite.</i>
<i>Hallite,</i>	<i>Maconite,</i>	

III. SERPENTINE AND TALC DIVISION.

481. Serpentine. Monoclinic; a basic magnesium silicate, $3\text{MgO} \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$.

VARIETIES:—

A. <i>In Crystals (probably pseudomorphs),</i>	6. <i>Williamsite,</i>
B. <i>Massive,</i>	D. <i>Thin Foliated,</i>
1. <i>Ordinary massive, (a) Precious,</i>	7. <i>Marmolite,</i>
(b) <i>Common,</i>	8. <i>Thermophyllite,</i>
2. <i>Resinous (Retinalite),</i>	E. <i>Fibrous,</i>
3. <i>Porcellanous,</i>	9. <i>Chrysotile (Asbestos of commerce),</i>
4. <i>Bowenite,</i>	10. <i>Picrolite,</i>
C. <i>Lamellar,</i>	F. <i>Serpentine Rocks.</i>
5. <i>Antigorite,</i>	<i>Hydrophile, Aphrodite, Cerolite,</i>
RELATED:— <i>Totaigite, Zöblitzite, Metaxoite, Limbachite.</i>	

482. Deweylite. Amorphous; a hydrous basic magnesium silicate, $4\text{MgO} \cdot 3\text{SiO}_2 \cdot 6\text{H}_2\text{O}$.

483. Genthite. Amorphous; a hydrous basic nickel and magnesium silicate, $2\text{NiO} \cdot 2\text{MgO} \cdot 3\text{SiO}_2 \cdot 6\text{H}_2\text{O}$.

RELATED:—*Röttisite*.

483A. Garnierite. Amorphous; a hydrated magnesium and nickel silicate, $\text{H}_2(\text{Ni}, \text{Mg})\text{SiO}_4 + \text{aq.} (?)$.

RELATED:—*De Saulesite, Pimelite, Alipite, Refdanskite.*

484. Talc. Orthorh. or monoc.; an acid magnesium metasilicate, $\text{H}_2\text{O} \cdot 3\text{MgO} \cdot 4\text{SiO}_2$.

VARIETIES:—

1. <i>Foliated, Talc,</i>	(b) <i>French Chalk,</i>	(a) <i>Fibrous,</i>
2. <i>Massive, Steatite or Soapstone,</i>	(c) <i>Indurated talc,</i>	(b) <i>Rensselaerite,</i>
(a) <i>Potstone,</i>	3. <i>Pseudomorphous,</i>	(c) <i>Pyrallolite.</i>
RELATED:— <i>Talcoid.</i>		

485. **Sepiolite.** Compact; a basic magnesium silicate, $2\text{H}_2\text{O} \cdot 2\text{MgO} \cdot 3\text{SiO}_2$.
 486. **Connarite.** Hexagonal(?); a hydrous nickel silicate, $2\text{H}_2\text{O} \cdot 2\text{NiO}_2 \cdot 3\text{SiO}_2(?)$.
 487. **Spadaite.** Massive; a hydrous magnesium silicate, $5\text{MgO} \cdot 6\text{SiO}_2 \cdot 4\text{H}_2\text{O}(?)$.
 488. **Saponite.** Massive; a hydrous magnesium and aluminium silicate(?).
 489. **Celadonite.** Earthy; an iron, magnesium and potassium silicate.
 490. **Glaucanite.** Amorphous; a hydrous iron and potassium silicate essentially.
 491. **Pholidolite.** Minute scales; a basic potassium, iron, magnesium and aluminium silicate, $5\text{H}_2\text{O} \cdot \text{K}_2\text{O} \cdot 12(\text{Fe}, \text{Mg})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 13\text{SiO}_2(?)$.

IV. KAOLIN DIVISION.

492. **Kaolinite.** Monoclinic; a basic aluminium silicate, $2\text{H}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

VARIETIES:—

- | | | |
|----------------------|-------------------------|------------------------|
| 1. <i>Crystals,</i> | (a) <i>Argilliform,</i> | (c) <i>Lithomarge,</i> |
| 2. <i>Ordinary:—</i> | (b) <i>Fariniform,</i> | 3. <i>Ferruginous.</i> |

RELATED:—*Meerschalmunit, Rectorite, Leverrierite.*

493. **Halloysite.** Massive; a hydrous basic aluminium silicate, $2\text{H}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 + \text{aq.}$

VARIETIES:—1. *Ordinary*, 2. *Smectite*, 3. *Lenzinite*, 4. *Bole*.

494. **Newtonite.** Rhomb.; a hydrous basic aluminium silicate, $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 5\text{H}_2\text{O}$.

495. **Cimolite.** Amorphous; a hydrous aluminium silicate, $2\text{Al}_2\text{O}_3 \cdot 9\text{SiO}_2 \cdot 6\text{H}_2\text{O}$.

496. **Montmorillonite.** Massive; a hydrous basic aluminium silicate, $\text{H}_2\text{Al}_2\text{Si}_4\text{O}_{12} + n(\text{aq.})(?)$.

VARIETIES:—1. *Montmorillonite*, 2. *Stolpenite*.

RELATED:—*Razoumowskyn*.

497. **Pyrophyllite.** Monoclinic(?); a basic aluminium silic., $\text{H}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$.

VARIETIES:—1. *Foliated or radiated*, 2. *Compact massive*.

RELATED:—*Gumbelite, Neurolite, Biharite*.

498. **Allophane.** Amorphous; hydrous aluminium silicate, $\text{Al}_2\text{SiO}_5 + 5\text{H}_2\text{O}$.

RELATED:—*Kieselaluminite, Sulfatallophan, Plumballophan, Carolathine, Samoite*.

499. **Collyrite.** Amorphous; a hydrous aluminium silicate, $2\text{Al}_2\text{O}_3 \cdot \text{SiO}_2 \cdot 9\text{H}_2\text{O}$.

RELATED:—*Dillnite*.

500. **Schröterite.** Amorphous; a hydrous aluminium silicate, $8\text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 30\text{H}_2\text{O}$.

RELATED:—*Scarbroite*.

APPENDIX TO CLAYS.

<i>Sinopite,</i>	<i>Rhodolite,</i>	<i>Oravitzite,</i>
<i>Melinite,</i>	<i>Sphragidite,</i>	<i>Hverfira,</i>
<i>Ochran,</i>	<i>Ehrenbergit,</i>	<i>Wolchonskoite,</i>
<i>Plinthite,</i>	<i>Portite,</i>	<i>Miloschite,</i>
<i>Smectite,</i>	<i>Teratolite,</i>	<i>Schwynite,</i>
<i>Fuller's Earth,</i>	<i>Callinite,</i>	<i>Chrome Ocher.</i>
<i>Malthacite,</i>	<i>Keffekilite,</i>	

V. CONCLUDING DIVISION.

501. **Cenosite.** Orthorhombic or monoclinic; a hydrous calcium and yttrium silicate and carbonate, $\text{Ca}(\text{Y}, \text{Er})_2(\text{SiO}_3)_4 \cdot \text{CaCO}_3 \cdot 2\text{H}_2\text{O}$.

502. **Thaumasite.** Tetragonal or hexagonal; a hydrous calcium silicate, carbonate and sulphate, $\text{CaSiO}_3 \cdot \text{CaCO}_3 \cdot \text{CaSO}_4 \cdot 15\text{H}_2\text{O}$.

503. **Uranophane.** Orthorhombic; a hydrous uranium and calcium silicate, $\text{CaO} \cdot 2\text{UO}_3 \cdot 2\text{SiO}_2 + 6\text{H}_2\text{O}$.

504. **Chrysocolla.** Cryptocrystalline; hydrous copper silicate, $\text{CuSiO}_3 + 2\text{H}_2\text{O}$.

VARIETIES:—

- | | | |
|--------------------------|-----------------------|--------------------------|
| 1. <i>Ordinary,</i> | 4. <i>Pilarite,</i> | 6. <i>Cyanochalcite,</i> |
| 2. <i>Dillenburgite,</i> | 5. <i>Demidovite,</i> | 7. <i>Asperolite,</i> |

3. *Copper pitch-blende,*

RELATED:—*Kupferblau*.

505. **Chloropal.** Amorphous; a hydrated iron silicate, $\text{Fe}_2\text{O}_3 \cdot 3\text{SiO}_2 \cdot 5\text{H}_2\text{O}(?)$.

VARIETIES:—1. *Ordinary*, 2. *Nontronite*, 3. *Pinguite*, 4. *Fettbol*, 5. *Graminit*.

RELATED:—*Glasurite, Protonontronite, Anthosiderite*.

506. Hisingerite. Amorphous; a hydrated ferric silicate.

VARIETIES:—1. *Hisingerite*, 2. *Degeröite*, 3. *Scotiolite*.

RELATED:—*Gillingite*, *Jollyte*, *Melanosiderite*, *Arasite*.

507. Bementite. Stellate masses; a hydrous manganese silicate, $2\text{MnSiO}_3 \cdot \text{H}_2\text{O}$ (approximately).

508. Caryopilite. Massive; a hydrous manganese silicate, $4\text{MnO} \cdot 3\text{SiO}_2 \cdot 3\text{H}_2\text{O}$ (approximately).

509. Neotocite. Amorphous; a hydrous manganese and iron silicate.

RELATED:—*Penwithite*.

APPENDIX TO HYDROUS SILICATES.

Allophite,
Antillite,
Aquacreptite,
Arctolite,
Balvraidite,
Baretite,
Bhreckite,
Bravaisite,
Chomicrite,
Davreuxite,
Dermatin,
Duporthite,
Ephesite,
Lesleyite,
Forchhammerite,

Ginilsite,
Groppite,
Hydrosilicite,
Leidyite,
Leucotile,
Lillite,
Melopsite,
Næsumite,
Nefedieffite,
Neolite,
Nigrescite,
Pelhamine,
Persbergite,
Picrofluite,

Picrosmine,
Pihlile,
Pilinite,
Pilolite,
Polyhydrite,
Pyknotrop,
Pyroïdesine,
Quincite,
Restormelile,
Rubisite,
Stübelite,
Talcosite,
Venerite,
Xylotile.

Titano-silicates, titanates.

510. Titanite. Monoclinic; calcium titano-silicate, $\text{CaO} \cdot \text{TiO}_2 \cdot \text{SiO}_2$.

VARIETIES:—

1. *Ordinary*:—

- (a) *Titanite*,
- (b) *Sphene*,
- (c) *Ligurite*,
- (d) *Spinthere*,
- (e) *Lederite*,

- (f) *Titanomorphite*,
- 2. *Manganesian*, *Greenovite*,
- 3. *Containing yttrium or cerium*,
 - (a) *Grothite*,
 - (b) *Alshedite*,
 - (c) *Eucolite-titanite*.

ALTERS TO:—*Rutile*, *Octahedrite*, *Perovskite*, *Xanthitane*.

RELATED:—*Pyromelane*, *Castellite*.

511. Keilhauite. Monoclinic; a calcium, aluminium, ferric iron and yttrium titano-silicate, $15\text{CaSiTiO}_5 \cdot (\text{Al}, \text{Fe}, \text{Y})_2(\text{Si}, \text{Ti})\text{O}_5(?)$.

512. Guarinite. Orthorhombic; calcium titano-silicate, $\text{CaO} \cdot \text{TiO}_2 \cdot \text{SiO}_2$.

513. Tscheffkinite. Massive; chiefly a thorium and cerium metals titano-silicate.

514. Astrophyllite. Orthorhombic; a sodium, potassium, iron and manganese titano-silicate, $(\text{Na}, \text{K})_4(\text{Fe}, \text{Mn})_4\text{Ti}(\text{SiO}_4)_4$.

515. Johnstrupite. Monoclinic; a complex cerium, calcium and sodium titano-fluo-silicate.

516. Mosandrite. Monoclinic; a cerium, calcium and sodium titano-fluo-silicate.

517. Rinkite. Monoclinic; a sodium, calcium and cerium titano-fluo-silicate, $(\text{Fe}, \text{Ti})_4\text{Na}_9\text{Ca}_{11}\text{Ce}_3(\text{SiO}_4)_{12}(?)$.

518. Perovskite. Isometric or pseudo-isometric; calcium titanate, CaTiO_3 .

519. Dysanalyte. Isometric; a calcium and iron titano-niobate, approximately $6(\text{Ca}, \text{Fe})\text{TiO}_3 \cdot (\text{Ca}, \text{Fe})\text{Nb}_2\text{O}_6$.

Hydrotitanite is an altered *Dysanalyte*.

3. Niobates, Tantalates.

1. PYROCHLORE GROUP. Isometric.

520. Pyrochlore. Isometric; chiefly calcium and cerium niobate with titanium, thorium and sodium fluoride.

520A. Koppite. Isometric; essentially a calcium and cerium pyroniobate.

521. Hatchettolite. Isometric; uranium tantaloniobate.

522. **Microлите**. Isometric; essentially calcium pyrotantalate, $\text{Ca}_2\text{Ta}_2\text{O}_7$.

RELATED :—*Pyrrhite*.

2. FERGUSONITE GROUP. Tetragonal.

523. **Fergusonite**. Tetragonal; essentially yttrium, erbium, cerium, uranium, iron and calcium metaniobate and tantalate, $(\text{Y}, \text{Er}, \text{Ce})(\text{Nb}, \text{Ta})\text{O}_4$.

RELATED :—*Rutherfordite*, *Kochelite*.

524. **Sipylite**. Tetragonal; chiefly erbium niobate, ErNbO_4 .

RELATED :—*Adelpholite*.

3. COLUMBITE GROUP. Orthorhombic.

525. **Columbite**. Orthorhombic; ferrous iron and manganese niobate, $(\text{Fe}, \text{Mn})\text{-Nb}_2\text{O}_6$.

NOTE :—Columbite graduates chemically into the next species, Tantalite.

526. **Tantalite**. Orthorhombic; iron tantalate, FeTa_2O_6 .

526A. **Skogbölite**. Orthorhombic; essentially an iron tantalate, FeTa_2O_6 .

RELATED :—*Isiolite*, *Mengite*, *Hermannolite*, *Ferro-ilmenite*.

527. **Tapiolite**. Tetragonal; an iron tantalate and niobate, $\text{Fe}(\text{Ta}, \text{Nb})_2\text{O}_6$.

4. SAMARSKITE GROUP. Orthorhombic.

528. **Yttrotantalite**. Orthorhombic; chiefly a yttrium metals and iron tantaloniobate.

529. **Samaraskite**. Orthorhombic; chiefly yttrium, cerium, iron and uranium tantaloniobate.

RELATED :—*Nohlite*, *Vietinghofite*.

530. **Ännerödite**. Orthorh.; essentially a uranium and yttrium pyro-niobate.

531. **Hielmite**. Orthorhombic; an iron, yttrium, manganese and calcium stannotantalate and niobate.

AESCHYNITE GROUP. Orthorhombic.

532. **Aeschynite**. Orthorhombic; a cerium metals, iron and calcium niobate and thoro-titanate, $\text{R}_2\text{Nb}_4\text{O}_{13} \cdot \text{R}_2(\text{Ti}, \text{Th})_5\text{O}_{13}(?)$.

533. **Polymignite**. Orthorhombic; a cerium metals, iron and calcium niobate and titano-zirconate, $5\text{RTiO}_3 \cdot 5\text{RZrO}_3 \cdot \text{R}(\text{Nb}, \text{Ta})_2\text{O}_6(?)$.

534. **Euxenite**. Orthorhombic; an yttrium, erbium, cerium and uranium niobate and titanate, $\text{R}(\text{NbO}_3)_3 \cdot \text{R}_2(\text{TiO}_3)_3 \cdot \frac{3}{2}\text{H}_2\text{O}(?)$.

535. **Polycrase**. Orthorhombic; an yttrium, erbium, cerium and uranium niobate and titanate, $\text{R}(\text{NbO}_3)_3 \cdot 2\text{R}(\text{TiO}_3)_3 \cdot 3\text{H}_2\text{O}$.

APPENDIX TO NIOBATES, TANTALATES.

Arrhenite,

Blomstrandite,

Rogersite.

4. Phosphates, Arsenates, Vanadates, Antimonates.

A. ANHYDROUS PHOSPHATES, VANADATES, ARSENATES, ANTIMONATES.

1. INTRODUCTORY SUBDIVISION.

536. **Xenotime**. Tetragonal; essentially yttrium phosphate, $\text{Y}_2\text{O}_3 \cdot \text{P}_2\text{O}_5$.

537. **Monazite**. Monoclinic; essentially phosphate of the cerium metals, $(\text{Ce}, \text{La}, \text{Di})\text{PO}_4$, with some ThO_2 .

RELATED :—*Kärrarfveite*.

538. **Berzeliite**. Isometric; calcium magnesium and manganese orthoarsenate, $(\text{Ca}, \text{Mg}, \text{Mn})_3\text{As}_2\text{O}_8$.

RELATED :—*Pseudoberzeliite*.

539. **Monimolite**. Isometric; a lead, iron and calcium antimonate, $(\text{Pb}, \text{Fe}, \text{Ca})_3\text{Sb}_2\text{O}_8$.

VARIETIES :—1. *Contains calcium*, 2. *Without calcium*.

540. Caryinite. Massive, monoclinic(?); a lead, manganese, calcium and magnesium arsenate, $(\text{Pb}, \text{Mn}, \text{Ca}, \text{Mg})_3 \text{As}_2 \text{O}_8$ (?).

541. Carminite. Orthorhombic; a lead and iron arsenate, $\text{Pb}_3 \text{As}_2 \text{O}_8 \cdot 10 \text{FeAsO}_4$ (?).

542. Pucherite. Orthorhombic; bismuth vanadate, $\text{Bi}_2 \text{O}_3 \cdot \text{V}_2 \text{O}_5$.

2. TRIPHYLITE GROUP. Orthorhombic.

543. Triphylite. Orthorhombic; an iron, manganese and lithium phosphate, $\text{Li}(\text{Fe}, \text{Mn}) \text{PO}_4$.

NOTE:—Triphylite graduates chemically into the next species, Lithiophilite.

544. Lithiophilite. Orthorhombic; a manganese, iron and lithium phosphate, $\text{Li}(\text{Mn}, \text{Fe}) \text{PO}_4$.

RELATED:—*Melanclor*, *Heterosite*, *Pseudotriphylite*, *Alluaudite*.

545. Natrophilite. Orthorh.; sodium and manganese phosphate, $\text{Na}_3 \text{PO}_4 \cdot \text{Mn}_3 \text{P}_2 \text{O}_8$.

546. Beryllonite. Orthorh.; beryllium and sodium phosphate, $\text{Na}_3 \text{PO}_4 \cdot \text{Be}_3 \text{P}_2 \text{O}_8$.

547. Herderite. Orthorhombic; a beryllium and calcium fluo-phosphate, $(\text{CaF}) \text{BePO}_4$.

548. Hamlinite. Rhombohedral; an aluminium or beryllium phosphate with water and fluorine.

3. APATITE GROUP. Hexagonal with pyramidal hemihedrisism.

549. Apatite. Hexagonal; calcium phosphate with either calcium fluoride or calcium chloride, $3 \text{Ca}_3 \text{P}_2 \text{O}_8 + \text{CaF}_2$ or $3 \text{Ca}_3 \text{P}_2 \text{O}_8 + \text{CaCl}_2$.

VARIETIES:—(Divided into fluor-apatites and chlor-apatites.)

1. Ordinary crystallized:

- | | | |
|------------------------------|-----------------------------------|----------------------------|
| (a) <i>Asparagus-stone</i> , | (d) <i>Cupro-apatite</i> , | 4. <i>Earthy apatite</i> , |
| (b) <i>Lasurapatite</i> . | 2. <i>Manganapatite</i> , | 5. <i>Pseudoapatite</i> , |
| (c) <i>Francolite</i> , | 3. <i>Fibrous (Phosphorite)</i> , | 6. <i>Staffelite</i> . |

RELATED:—*Osteolite*, *Epiphosphorite*, *Talc-apatite*, *Hydroapatite*, *Phosphatic Nodules*, *Guano*.

550. Pyromorphite. Hexagonal; lead chloride and phosphate, $3 \text{Pb}_3 \text{P}_2 \text{O}_8 \cdot \text{PbCl}_2$.

VARIETIES:—

1. Ordinary:—

- | | | |
|-----------------------------------|---------------------------|------------------------------|
| (a) <i>Crystals</i> , | (f) <i>Earthy</i> . | 3. <i>Chromiferous</i> . |
| (b) <i>Acicular</i> , | 2. <i>Polysphaerite</i> . | 4. <i>Arseniferous</i> , |
| (c) <i>Concretionary masses</i> , | (a) <i>Miesite</i> , | 5. <i>Pseudomorphous</i> , |
| (d) <i>Fibrous</i> , | (b) <i>Nussierite</i> , | (a) after <i>galenite</i> , |
| (e) <i>Granular</i> , | (c) <i>Cherokine</i> , | (b) after <i>cerussite</i> . |

ALTERS TO:—*Galenite*, *Cerussite*, *Calamine*, *Calcite*, *Limonite*.

551. Mimeteite. Hexagonal; lead arsenate and lead chloride, $3 \text{Pb}_3 \text{As}_2 \text{O}_8 \cdot \text{PbCl}_2$.

VARIETIES:—

- | | | |
|--------------------------|----------------------------|-------------------------|
| 1. <i>Ordinary:—</i> | (b) <i>Capillary</i> , | 2. <i>Calciferous</i> , |
| (a) <i>In crystals</i> , | (c) <i>Concretionary</i> , | 3. <i>Campylite</i> . |

Endlichite.—Hexagonal; intermediate between *Mimeteite* and *Vanadinite*. Contains nearly equal portions of lead arsenate and vanadate, with chloride.

552. Vanadinite. Hexagonal; lead vanadate and lead chloride, $3 \text{Pb}_3 \text{V}_2 \text{O}_8 \cdot \text{PbCl}_2$.

RELATED:—*Hedyphane*, *Pleonectite*.

4. WAGNERITE GROUP. Monoclinic.

553. Wagnerite. Monoclinic; magnesium fluo-phosphate, $\text{Mg}_3 \text{P}_2 \text{O}_8 \cdot \text{MgF}_2$.

VARIETIES:—1. *Wagnerite*, 2. *Kjerulfine*.

RELATED:—*Cryphiolite*.

554. Spodiosite. Orthorhombic(?); a calcium fluo-phosphate, $\text{Ca}_3 \text{P}_2 \text{O}_8 \cdot \text{CaF}_2$ (?).

555. Triphlite. Monoclinic; an iron, manganese, calcium and magnesium fluo-phosphate, $\text{R}_3 \text{P}_2 \text{O}_8 \cdot \text{RF}_2$.

VARIETIES:—1. *Ordinary*, 2. *Zwieselite*, 3. *Talktriplite*.

RELATED:—*Griphite*, *Sarcopsidite*.

556. Triploidite. Monoclinic; basic manganese and iron phosphate, $4(\text{Mn}, \text{Fe}) \cdot \text{O} \cdot \text{P}_2 \text{O}_5 \cdot \text{H}_2 \text{O}$.

557. Sarkinite. Monoclinic; basic manganese arsenate, $4 \text{MnO} \cdot \text{As}_2 \text{O}_5 \cdot \text{H}_2 \text{O}$.

VARIETIES:—1. *Sarkinite*, 2. *Polyarsenite*.

5. AMBLYGONITE GROUP.

558. **Durangite**. Monoc.; a sodium and aluminium fluo-arsenate, $\text{AlAsO}_4 \cdot \text{NaF}$.
 559. **Amblygonite**. Tric.; an aluminium and lithium fluo-phosphate, $\text{AlPO}_4 \cdot \text{LiF}$.

B. ACID AND BASIC PHOSPHATES, ARSENATES, ETC.

560. **Monetite**. Triclinic; acid calcium phosphate, $2\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$.
 RELATED :—*Natrophite*.

OLIVENITE GROUP. Orthorhombic.

561. **Olivenite**. Orthorhombic; basic copper arsenate, $4\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot \text{H}_2\text{O}$.
 VARIETIES :—(a) *Crystallized*, (b) *Fibrous (wood-copper)*, (c) *Earthy*.
 562. **Libethenite**. Orthorhombic; basic copper phosphate, $4\text{CuO} \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$.
 563. **Adamite**. Orthorhombic; basic zinc arsenate, $4\text{ZnO} \cdot \text{As}_2\text{O}_5 \cdot \text{H}_2\text{O}$.
 564. **Descloizite**. Orthorhombic; basic lead and zinc vanadate, $(\text{Pb}, \text{Zn})_2(\text{OH})\text{VO}_4$.
 VARIETIES :—1. *Ordinary crystals*, 2. *Cuprodescloizite*.
 RELATED :—*Eusynchite*, *Dechenite*.
 565. **Calciovolborthite**. Probably a basic copper and calcium vanadate, $4(\text{Cu}, \text{Ca})\text{O} \cdot \text{V}_2\text{O}_5 \cdot \text{H}_2\text{O}(?)$.
 566. **Brackebuschite**. Monoclinic(?); perhaps a basic lead, iron and manganese vanadate, $(\text{Pb}, \text{Fe}, \text{Mn})_3\text{V}_2\text{O}_8 \cdot \text{H}_2\text{O}(?)$.
 567. **Psittacinite**. Crypto-crystalline coating; a hydrous, basic, lead and copper vanadate, $(\text{Pb}, \text{Cu})_4(\text{OH})_2\text{V}_2\text{O}_8 \cdot \text{H}_2\text{O}(?)$.
 RELATED :—*Mottamite*, *Chileite*, *Vanadiobite*, *Wicklowite*.
 568. **Erinite**. Crystalline groups; basic copper arsenate, $5\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$.
 569. **Dihydrite**. Monoclinic or triclinic; essentially a basic copper phosphate, $5\text{CuO} \cdot \text{P}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$.
 570. **Pseudomalachite**. Massive; a basic copper phosphate, $6\text{CuO} \cdot \text{P}_2\text{O}_5 \cdot 3\text{H}_2\text{O}(?)$.
 RELATED :—*Ehlite*.
 571. **Clinoclasite**. Monoclinic; a basic copper arsenate, $6\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 572. **Chondrarsenite**. Embedded grains; a basic manganese arsenate, perhaps $6\text{MnO} \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 RELATED :—*Xantharsenite*.
 573. **Dufrenite**. Orthorh.; a basic ferric iron phosphate, partly $2\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 574. **Lazulite**. Monoclinic; a basic iron, aluminium and magnesium phosphate, $(\text{Fe}, \text{Mg})\text{O} \cdot \text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$.
 575. **Tavistockite**. Microscopic acicular crystals; a basic calcium and aluminium phosphate, $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 576. **Cirrolite**. Compact; a basic calcium and aluminium phosphate, $6\text{CaO} \cdot 2\text{Al}_2\text{O}_3 \cdot 3\text{P}_2\text{O}_5 \cdot 3\text{H}_2\text{O}(?)$.
 577. **Arsenosiderite**. Tetragonal or hexagonal(?); basic iron and calcium arsenate, $6\text{CaO} \cdot 4\text{Fe}_2\text{O}_3 \cdot 3\text{As}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.
 578. **Allactite**. Monoclinic; basic manganese arsenate, $7\text{MnO} \cdot \text{As}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.
 579. **Synadelphite**. Monoclinic; basic manganese and aluminium arsenate, $2(\text{Al}, \text{Mn})\text{AsO}_4 \cdot 5\text{Mn}(\text{OH})_2$.
 580. **Flinkite**. Orthorh.; basic manganese arsenate, $4\text{MnO} \cdot \text{Mn}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.
 581. **Hematolite**. Rhombohedral; a basic manganese and aluminium arsenate, $(\text{AlMn})\text{AsO}_4 \cdot 4\text{Mn}(\text{OH})_2$.
 582. **Arseniopcleite**. Massive; a basic manganese, calcium, lead, magnesium and iron arsenate, $9(\text{Mn}, \text{Ca}, \text{PbMg})\text{O} \cdot (\text{MnFe})_2\text{O}_3 \cdot 3\text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}(?)$.
 RELATED :—*Pleurasite*.
 583. **Manganostibiite**. Orthorhombic(?); basic manganese antimonate, $10\text{MnO} \cdot \text{Sb}_2\text{O}_5(?)$.
 RELATED :—*Ferrostibian*, *Stibiätil*.
 584. **Atelestite**. Monoclinic; basic bismuth arsenate, $3\text{Bi}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$.

C. HYDROUS PHOSPHATES, ARSENATES, ETC.—NORMAL DIVISION.

585. **Struvite**. Orthorhombic; hydrous magnesium and ammonium phosphate, $\text{NH}_4\text{MgPO}_4 \cdot 6\text{H}_2\text{O}$.

RELATED (*Guano Minerals*) :—

Guanapite,
Guano calate,

Oxammite,
Phosphammite,

Epiglaubite,
Redondite,

Dittmarite,
Müllerite.

586. **Collophanite**. Amorphous; hydrous calcium phosphate, $3\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot \text{H}_2\text{O}$.

RELATED :—*Pyrophosphorite*.

587. **Hopeite**. Orthorhombic; probably hydrous zinc phosphate, $\text{Zn}_3\text{P}_2\text{O}_8 + \text{H}_2\text{O}$.

588. **Dickinsonite**. Monoclinic; a hydrous manganese, iron, sodium, calcium, potassium and lithium phosphate, $3(\text{Mn}, \text{Fe}, \text{Na}_2, \text{Ca}, \text{K}_2, \text{Li}_2)_3\text{P}_2\text{O}_8 + \text{H}_2\text{O}$.

589. **Fillowite**. Monoclinic; a hydrous manganese, iron, calcium and sodium phosphate, $3(\text{Mn}, \text{Fe}, \text{Ca}, \text{Na}_2)_3\text{P}_2\text{O}_8 + \text{H}_2\text{O}$.

ROSELITE GROUP. Triclinic.

590. **Roselite**. Triclinic; hydrous calcium, cobalt and magnesium arsenate, $(\text{Ca}, \text{Co}, \text{Mg})_3\text{As}_2\text{O}_8 \cdot 2\text{H}_2\text{O}$.

591. **Brandtite**. Triclinic; hydrous calcium and manganese arsenate, $2\text{CaO} \cdot \text{MnO} \cdot \text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$.

592. **Fairfieldite**. Triclinic; hydrous calcium and manganese phosphate, $\text{Ca}_2\text{MnP}_2\text{O}_8 + 2\text{H}_2\text{O}$.

593. **Messelite**. Tric.; hydrous calcium and iron phosphate, $(\text{Ca}, \text{Fe})\text{P}_2\text{O}_8 + 2\frac{1}{2}\text{H}_2\text{O}$.

594. **Reddingite**. Orthorhombic; hydrous manganese phosphate, $\text{Mn}_3\text{P}_2\text{O}_8 + 3\text{H}_2\text{O}$.

595. **Picropharmacolite**. Spherical; hydrous calcium and magnesium arsenate, $(\text{Ca}, \text{Mg})_3\text{As}_2\text{O}_8 + 6\text{H}_2\text{O}$.

596. **Trichalcite**. Radiating and dendritic; hydrous copper arsenate, $\text{Cu}_3\text{As}_2\text{O}_8 + 5\text{H}_2\text{O}$.

RELATED :—*Lavendulan*, *Chlorotile*.

VIVIANITE GROUP. Monoclinic.

597. **Vivianite**. Monoclinic; hydrous ferrous iron phosphate, $\text{Fe}_3\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$.

598. **Symplectite**. Monoclinic; hydrous iron arsenate, probably $\text{Fe}_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

599. **Bobierite**. Monoclinic; hydrous magnesium phosphate, $\text{Mg}_3\text{P}_2\text{O}_8 + 8\text{H}_2\text{O}$.

600. **Hørnesite**. Monoclinic; hydrous magnesium arsenate, $\text{Mg}_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

601. **Erythrite**. Monoclinic; hydrous cobalt arsenate, $\text{Co}_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

VARIETIES :—1. *Crystallized*, 2. *Earthy* (cobalt bloom).

602. **Annabergite**. Monoclinic; hydrous nickel arsenate, $\text{Ni}_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

603. **Cabrerite**. Monoclinic; hydrous nickel and magnesium arsenate, $(\text{Ni}, \text{Mg})_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

604. **Köttigite**. Monoclinic; hydrous zinc arsenate, $\text{Zn}_3\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$. Cobalt and nickel replace some zinc.

605. **Rhabdophanite**. Massive; a hydrous phosphate of the cerium and yttrium metals, $(\text{La}, \text{Di}, \text{Y})\text{PO}_4 + \text{H}_2\text{O}$.

606. **Churchite**. Monoclinic (?); a hydrous cerium, didymium and calcium phosphate, $\text{CePO}_4 + 4\text{H}_2\text{O}$.

SCORODITE GROUP. Orthorhombic.

607. **Scorodite**. Orthorhombic; hydrous ferric iron arsenate, $\text{Fe}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.

ALTERS TO :—*Limonite*.

RELATED :—*Joggmaite*.

608. **Strengite**. Orthorhombic; hydrous ferric iron phosphate, $\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.

609. **Phosphosiderite**. Orthorhombic; a hydrous ferric iron phosphate, $\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 3\frac{1}{2}\text{H}_2\text{O}$.

610. **Barrandite**. Spheroidal concretions; hydrous aluminium and iron phosphate, $(\text{AlFe})_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.

611. **Variscite**. Orthorhombic; hydrous aluminium phosphate, $\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.

RELATED :—*Planerite*, *Amphithalite*.

612. **Callainite**. Massive; hydrous aluminium phosphate, $\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.

613. **Zepharovichite**. Crystalline; a hydrous aluminium phosphate, $\text{AlPO}_4 \cdot 3\text{H}_2\text{O}$.

RELATED :—*Gibbsite*.

614. **Koninckite**. Radiated; hydrous ferric iron phosphate, $\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$.

HYDROUS PHOSPHATES, ETC.—ACID DIVISION.

615. **Stercorite**. Monoclinic; hydrous acid sodium ammonium phosphate, $\text{HNa}(\text{NH}_4)\text{PO}_4 + 4\text{H}_2\text{O}$.

616. **Haidingerite**. Orthor.; hydrous acid calcium arsenate, $2\text{CaO} \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.

617. **Pharmacolite**. Monoc.; hydrous acid calcium arsenate, $2\text{CaO} \cdot \text{As}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.

618. **Brushite**. Monoclinic; a hydrous acid calcium phosphate, $2\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.

619. **Metabrushite**. Monoc.; a hydrous acid calcium phosphate, $4\text{CaO} \cdot 2\text{P}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$.
 ALTERED METABRUSHITE:—*Zeugite*, *Ornithite*.
 620. **Martinite**. Rhomb.; hydrous acid calcium phosphate, $5\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot \frac{3}{2}\text{H}_2\text{O}$.
 621. **Newberyite**. Orthorhombic; hydrous acid magnesium phosphate, $2\text{MgO} \cdot \text{P}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$.
 622. **Wapplerite**. Monoclinic (or triclinic); hydrous acid calcium arsenate, $2\text{CaO} \cdot \text{As}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
 RELATED:—*Rösslerite*.
 623. **Hannayite**. Triclinic; a hydrous acid magnesium and ammonium phosphate, $(\text{NH}_4)_2\text{O} \cdot 3\text{MgO} \cdot 2\text{P}_2\text{O}_5 \cdot 10\text{H}_2\text{O}$.
 624. **Hureaulite**. Monoclinic; a hydrous acid manganese phosphate, $5\text{MnO} \cdot 2\text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.
 VARIETIES:—(a) *Brownish-orange* (ordinary), (b) *Rose-violet*, (c) *Pale rose*.
 625. **Forbesite**. Fibro-crystalline; hydrous acid nickel and cobalt arsenate, $\text{H}_2(\text{Ni}, \text{Co})_2\text{As}_2\text{O}_8 + 8\text{H}_2\text{O}$.

HYDROUS PHOSPHATES, ETC.—BASIC DIVISION.

626. **Isoclasite**. Monoc. (?); hydrous basic calcium phosphate, $4\text{CaO} \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.
 627. **Hemafibrite**. Orthorhombic; hydrous basic manganese arsenate, $6\text{MnO} \cdot \text{As}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.
 628. **Conichalcite**. Reniform and massive; a hydrous basic copper and calcium arsenate, perhaps $4(\text{Cu}, \text{Ca})\text{O} \cdot \text{As}_2\text{O}_5 \cdot 1\frac{1}{2}\text{H}_2\text{O}$.
 629. **Bayldonite**. Mammillary concretions; hydrous basic lead and copper arsenate, $4(\text{Pb}, \text{Cu})\text{O} \cdot \text{As}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$.
 630. **Tagilite**. Monoclinic; hydrous basic copper phosphate, $4\text{CuO} \cdot \text{P}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 631. **Leucochalcite**. Acicular; a hydrous basic copper arsenate, probably $4\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 632. **Euchroite**. Orthorh.; a hydrous basic copper arsenate, $4\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$.
 633. **Volborthite**. Six-sided tables; a hydrous basic copper, calcium and barium vanadate, perhaps $(\text{Cu}, \text{Ca}, \text{Ba})_3(\text{OH})_3\text{VO}_4 + 6\text{H}_2\text{O}$.
 634. **Cornwallite**. Massive; a hydrous basic copper arsenate, $5\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 635. **Tyrolite**. Orthorhombic; a hydrous basic copper arsenate, perhaps $5\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.
 636. **Chalcophyllite**. Rhombohedral; hydrous basic copper arsenate, $7\text{CuO} \cdot \text{As}_2\text{O}_5 \cdot 14\text{H}_2\text{O}$ (?).
 ALTERS TO:—*Chrysocolla*.
 637. **Veszelyite**. Monoclinic (?); a hydrous basic copper and zinc phospho-arsenate, $(\text{CuZn})_7(\text{OH})_8(\text{As}, \text{P})_8\text{O}_8 + 5\text{H}_2\text{O}$.
 638. **Ludlamite**. Monoclinic; a hydrous basic iron phosphate, $7\text{FeO} \cdot 2\text{P}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.
 639. **Wavellite**. Orthorhombic; hydrous basic aluminium phosphate, $3\text{Al}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$.
 RELATED:—*Lime-wavellite*.
 640. **Fischerite**. Orthorhombic; hydrous basic aluminium phosphate, $2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
 641. **Peganite**. Orthorhombic; a hydrous basic aluminium phosphate, $2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$.
 642. **Turquois**. Massive; a hydrous basic aluminium phosphate, $2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 5\text{H}_2\text{O}$.
 643. **Sphaerite**. Globular concretions; a hydrous basic aluminium phosphate, perhaps $5\text{Al}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 16\text{H}_2\text{O}$.
 644. **Liskeardite**. Massive; hydrous basic aluminium and iron arsenate, $3(\text{Al}, \text{Fe})_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 16\text{H}_2\text{O}$.
 645. **Evansite**. Massive; hydrous basic aluminium phosphate, $3\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 18\text{H}_2\text{O}$.
 RELATED:—*Ceruleolactite*, *Taranakite*, *Berlinite*, *Trolleite*, *Angelite*, *Attacolite*.
 646. **Pharmacosiderite**. Isometric; hydrous basic iron arsenate, $4\text{Fe}_2\text{O}_3 \cdot 3\text{As}_2\text{O}_5 \cdot 15\text{H}_2\text{O}$.
 ALTERS TO:—*Psilomelane*, *Limonite*, *Hematite*.
 647. **Cacoxenite**. Radiated tufts; hydrous basic iron phosphate, $2\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$.
 648. **Beraunite**. Monoclinic; hydrous basic iron phosphate, $3\text{Fe}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
 VARIETIES:—1. *Beraunite*, 2. *Eleonorite*.
 RELATED:—*Globosite*, *Picite*, *Delavauxite*.
 649. **Childrenite**. Orthorhombic; a hydrous basic iron, aluminium and manganese phosphate, $(\text{Fe}, \text{Mn})\text{Al}(\text{OH})_2 \cdot \text{PO}_4 + 2\text{H}_2\text{O}$.

650. **Eosphorite**. Orthorhombic; a hydrous basic manganese, iron and aluminium phosphate, $(\text{Mn, Fe})\text{Al}(\text{OH})_2\text{PO}_4 + 2\text{H}_2\text{O}$.
651. **Mazapilite**. Orthorhombic; a hydrous basic iron and calcium arsenate, $3\text{CaO} \cdot 2\text{Fe}_2\text{O}_3 \cdot 2\text{As}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$.
652. **Calcioferrite**. Monoclinic(?); a hydrous basic iron and calcium phosphate, $6\text{CaO} \cdot 3\text{Fe}_2\text{O}_3 \cdot 4\text{P}_2\text{O}_5 \cdot 19\text{H}_2\text{O}$.
653. **Borickite**. Reniform, massive; hydrous basic iron and calcium phosphate, $\text{Ca}_3\text{Fe}_2(\text{PO}_4)_4 \cdot 12\text{Fe}(\text{OH})_3 + 6\text{H}_2\text{O}(?)$.
RELATED :—*Richellite*.
654. **Liroconite**. Monoclinic; a hydrous basic aluminium and copper arsenate, perhaps $18\text{CuO} \cdot 4\text{Al}_2\text{O}_3 \cdot 5\text{As}_2\text{O}_5 \cdot 55\text{H}_2\text{O}$.
655. **Chenevixite**. Massive; perhaps a hydrous copper and iron arsenate, $2\text{CuO} \cdot \text{Fe}_2\text{O}_3 \cdot \text{As}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
RELATED :—*Hewoodite*.
656. **Chalcosiderite**. Triclinic; hydrous copper and ferric iron phosphate, $\text{CuO} \cdot 3\text{Fe}_2\text{O}_3 \cdot 2\text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
RELATED :—*Andrewsite*.
657. **Goyazite**. Tetragonal or hexagonal; hydrous basic calcium and aluminium phosphate, $3\text{CaO} \cdot 5\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.
658. **Plumbogummite**. Hexagonal; a hydrous lead and aluminium phosphate, perhaps $\text{PbO} \cdot 2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.

URANITE GROUP.

659. **Torbernite**. Tetragonal; hydrous uranium and copper phosphate, $\text{CuO} \cdot 2\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
660. **Zeunerite**. Tetragonal; hydrous copper and uranium arsenate, $\text{CuO} \cdot 2\text{UO}_3 \cdot \text{As}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
661. **Autunite**. Orthorhombic; a hydrous calcium and uranium phosphate, $\text{CaO} \cdot 2\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
662. **Uranospinite**. Orthorhombic; probably a calcium and uranium arsenate, $\text{CaO} \cdot 2\text{UO}_3 \cdot \text{As}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
663. **Uranocircite**. Orthorhombic; hydrous barium and uranium phosphate, $\text{BaO} \cdot 2\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.
664. **Phosphuranylite**. Pulverulent incrustation; hydrous uranium phosphate, $3\text{UO}_3 \cdot \text{P}_2\text{O}_5 \cdot 6\text{H}_2\text{O}$.
665. **Trögerite**. Monoclinic; a hydrous uranium arsenate, $3\text{UO}_3 \cdot \text{As}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$.
RELATED :—*Fritzscheite*.
666. **Walpurgite**. Triclinic; probably a hydrous basic bismuth and uranium arsenate, $5\text{Bi}_2\text{O}_3 \cdot 3\text{UO}_3 \cdot 2\text{As}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$.
667. **Rhagite**. Crystalline; hydrous bismuth arsenate, perhaps $5\text{Bi}_2\text{O}_3 \cdot 2\text{As}_2\text{O}_5 \cdot 9\text{H}_2\text{O}$.
668. **Mixite**. Acicular; a hydrated basic copper and bismuth arsenate, perhaps $20\text{CuO} \cdot \text{Bi}_2\text{O}_3 \cdot 5\text{As}_2\text{O}_5 \cdot 22\text{H}_2\text{O}$.

ANTIMONATES; ALSO ANTIMONITES, ARSENITES.

669. **Atopite**. Isometric; perhaps calcium pyroantimonate, $2\text{CaO} \cdot \text{Sb}_2\text{O}_5$.
RELATED :—*Schneebergite*.
670. **Bindheimite**. Amorphous; a hydrous lead antimonate.
671. **Romeite**. Tetragonal; a calcium antimonate, perhaps $\text{CaO} \cdot \text{Sb}_2\text{O}_5$.
672. **Nadorite**. Orthorhombic; lead chlor-antimonate, $\text{PbSb}_2\text{O}_4 \cdot \text{PbCl}_2$.
673. **Ecdemite**. Tetragonal; perhaps lead chlor-arsenate, $\text{Pb}_4\text{As}_2\text{O}_7 \cdot 2\text{PbCl}_2$.
674. **Ochrolite**. Orthorhombic; probably lead chlor-antimonate, $\text{Pb}_4\text{Sb}_2\text{O}_7 \cdot 2\text{PbCl}_2$.
675. **Trippkeite**. Tetragonal; essentially a copper arsenate, $(n\text{CuO} \cdot \text{As}_2\text{O}_5)$.

ANTIMONATES OR ANTIMONITES OF DOUBTFUL CHARACTER:

<i>Ammiolite,</i>	<i>Barcenite,</i>	<i>Taznite,</i>
<i>Arequipite,</i>	<i>Coronguite,</i>	

PHOSPHATES OR ARSENATES WITH CARBONATES, SULPHATES, BORATES.

676. **Dahllite**. Fibrous crusts; hydrous calcium phosphate and carbonate, $2\text{Ca}_3\text{P}_2\text{O}_8 \cdot \text{CaCO}_3 \cdot \frac{1}{2}\text{H}_2\text{O}$.
RELATED :—*Ciplyte*.

677. **Diadochite**. Monoclinic; perhaps a hydrous iron sulpho-phosphate, $2\text{Fe}_2\text{O}_3 \cdot 2\text{SO}_3 \cdot \text{P}_2\text{O}_5 \cdot 12\text{H}_2\text{O}$.
 VARIETIES:—1. *Ordinary*, 2. *Destinezite*.
 678. **Pitticite**. Reniform and massive; a hydrous ferric iron arsenate and sulphate.
 679. **Svanbergite**. Rhombohedral; a hydrous aluminium and calcium phosphate and sulphate.
 680. **Beudantite**. Rhombohedral; a lead and ferric iron phosphate or arsenate and sulphate.
 681. **Lindackerite**. Orthorhombic; perhaps a hydrous nickel and copper sulphate and arsenate, $3\text{NiO} \cdot 6\text{CuO} \cdot \text{SO}_3 \cdot 2\text{As}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$.
 682. **Lüneburgite**. Flattened masses; hydrous magnesium borate and phosphate, $3\text{MgO} \cdot \text{B}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$.

APPENDIX TO PHOSPHATES, ARSENATES, ETC.

Miriquidite, *Arsenate of nickel* (crystalline), *Arsenate of nickel* (amorphous).

NITRATES.

683. **Soda Niter**. Rhombohedral; sodium nitrate, NaNO_3 .
 684. **Niter**. Orthorhombic; potassium nitrate, KNO_3 .
 685. **Nitrocalcite**. Efflorescent tufts; hydrous calcium nitrate, $\text{Ca}(\text{NO}_3)_2 \cdot n\text{H}_2\text{O}$.
 686. **Nitromagnesite**. Efflorescences; hyd. magnesium nitrate, $\text{Mg}(\text{NO}_3)_2 \cdot n\text{H}_2\text{O}$.
 687. **Nitrobarite**. Isometric; barium nitrate, $\text{Ba}(\text{NO}_3)_2$.
 688. **Gerhardtite**. Orthorhombic; basic copper nitrate, $4\text{CuO} \cdot \text{N}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$.
 689. **Darapskite**. Tetragonal; hydrous sodium sulphate and nitrate, $\text{NaNO}_3 \cdot \text{Na}_2\text{SO}_4 \cdot \text{H}_2\text{O}$.
 690. **Nitroglauberite**. Fibrous crystalline; hydrous sodium nitrate and sulphate, $6\text{NaNO}_3 \cdot 2\text{Na}_2\text{SO}_4 \cdot 3\text{H}_2\text{O}$.

5. Borates.

691. **Nordenskiöldine**. Rhombohedral; calcium and tin borate, $\text{CaO} \cdot \text{SnO}_2 \cdot \text{B}_2\text{O}_3$.
 692. **Jeremejevite**. Hexagonal; aluminium borate, $\text{Al}_2\text{O}_3 \cdot \text{B}_2\text{O}_3$.
 693. **Sussexite**. Orthorhombic (?); a manganese, zinc and magnesium borate, $2(\text{Mn}, \text{Zn}, \text{Mg})\text{O} \cdot \text{B}_2\text{O}_3 \cdot \text{H}_2\text{O}$.
 694. **Ludwigite**. Orthorhombic; a magnesium borate with ferrous and ferric iron oxides, perhaps $3\text{MgO} \cdot \text{B}_2\text{O}_3 + \text{FeO} \cdot \text{Fe}_2\text{O}_3$.
 ALTERS TO:—*Limonite*.
 695. **Pinakiolite**. Orthorhombic; a magnesium and manganese borate, $3\text{MgO} \cdot \text{B}_2\text{O}_3 + \text{MnO} \cdot \text{Mn}_2\text{O}_3$.
 696. **Hambergite**. Orthorhombic; a basic beryllium borate, $4\text{BeO} \cdot \text{B}_2\text{O}_3 \cdot \text{H}_2\text{O}$.
 697. **Szaibelyite**. Acicular; a hydrous magnesium borate, $5\text{MgO} \cdot 2\text{B}_2\text{O}_3 \cdot 1\frac{1}{2}\text{H}_2\text{O}$.
 698. **Boracite**. Isometric externally, orthorhombic molecularly; magnesium chloroborate, $6\text{MgO} \cdot \text{MgCl}_2 \cdot 8\text{B}_2\text{O}_3$.
 VARIETIES:—1. *Crystals*, 2. *Massive*.
 699. **Rhodizite**. Isometric; aluminium and potassium borate chiefly, $(\text{K}, \text{Rb}, \text{Cs})_2 \cdot 0.2\text{Al}_2\text{O}_3 \cdot 3\text{B}_2\text{O}_3$.
 700. **Warwickite**. Orthorhombic; a magnesium, iron and titanium borate, perhaps $6\text{MgO} \cdot \text{FeO} \cdot 2\text{TiO}_2 \cdot 3\text{B}_2\text{O}_3$.
 701. **Howlite**. Orthorhombic (?); a calcium silicoborate, $4\text{CaO} \cdot 5\text{B}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 5\text{H}_2\text{O}$.
 RELATED:—*Winkworthite*.
 702. **Lagonite**. Incrusting; a hydrous ferric iron borate, $\text{Fe}_2\text{O}_3 \cdot 3\text{B}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.
 703. **Larderellite**. Monoc.; a hydrous ammonium borate, $(\text{NH}_4)_2\text{O} \cdot 4\text{B}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$.
 704. **Colemanite**. Monoclinic; a hydrous calcium borate, $2\text{CaO} \cdot 3\text{B}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$.
 RELATED:—*Pricite*, *Pandermitte*.
 705. **Pinnoite**. Tetragonal; a hydrous magnesium borate, $\text{MgO} \cdot \text{B}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.
 RELATED:—*Kaliborite*.
 706. **Heintzite**. Monoclinic; a hydrous magnesium and potassium borate, $\text{K}_2\text{Mg}_4 \cdot \text{B}_{18}\text{O}_{32} \cdot 16\text{H}_2\text{O}$ (?).
 707. **Borax**. Monoclinic; a hydrous sodium borate, $\text{Na}_2\text{O} \cdot 2\text{B}_2\text{O}_3 \cdot 10\text{H}_2\text{O}$.
 RELATED:—*Tincalconite*.

708. Ulexite. Masses of capillary crystals; a hydrous sodium and calcium borate, probably $\text{Na}_2\text{O} \cdot 2\text{CaO} \cdot 5\text{B}_2\text{O}_3 \cdot 16\text{H}_2\text{O}$.

ALTERS TO :—Gypsum.

RELATED :—*Franklandite*, *Cryptomorphite*.

709. Bechilite. Crusts; a hydrous calcium borate, $\text{CaO} \cdot 2\text{B}_2\text{O}_3 \cdot 4\text{H}_2\text{O}$.

RELATED :—*Hayesine*.

710. Hydroboracite. Monoclinic(?); hydrous calcium and magnesium borate, $\text{CaO} \cdot \text{MgO} \cdot 3\text{B}_2\text{O}_3 \cdot 6\text{H}_2\text{O}$.

URANATES.

711. Uraninite. Isometric; uranate of uranyl, lead, generally thorium, often lanthanum and yttrium metals.

VARIETIES :—

1. *Crystallized*,

(b) *Bröggerite*,

(d) *Nivenite*,

(a) *Urannibite*,

(c) *Cleveite*,

2. *Massive (Pitchblende)*.

ALTERS TO :—Gummite, Uranophane.

RELATED :—*Coracite*.

712. Gummite. Massive; alteration of uraninite, perhaps $(\text{PbCa})\text{U}_3\text{SiO}_{12} \cdot 6\text{H}_2\text{O}$.

RELATED :—*Yttrogummite*, *Thorogummite*, *Chlorothorite*.

713. Uranosphærite. Globular; a hydrous bismuth uranate, $\text{Bi}_2\text{O}_3 \cdot 2\text{UO}_3 \cdot 3\text{H}_2\text{O}$.

6. Sulphates, Chromates, Tellurates.

A. ANHYDROUS SULPHATES, ETC.

714. Mascagnite. Orthorhombic; ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$.

715. Taylorite. Crystalline; potassium and ammonium sulphate, $5\text{K}_2\text{SO}_4 \cdot (\text{NH}_4)_2\text{SO}_4$.

716. Thenardite. Orthorhombic; sodium sulphate, Na_2SO_4 .

RELATED :—*Dihydro-thenardite*.

717. Aphthitalite. Rhombohedral; potassium and sodium sulphate, $(\text{K}, \text{Na})_2\text{SO}_4$.

RELATED :—*Arcanite*.

718. Glauberite. Monoclinic; sodium and calcium sulphate, $\text{Na}_2\text{SO}_4 \cdot \text{CaSO}_4$.

BARITE GROUP. Orthorhombic.

719. Barite. Orthorhombic; barium sulphate, BaSO_4 .

VARIETIES :—

1. *Ordinary* :—

(a) *Crystals*,

(b) *Crested*,

(c) *Columnar*,

(d) *Globular (Bologna Stone)*,

(e) *Lamellar*,

(f) *Granular*,

(g) *Compact*,

(h) *Earthy*,

(i) *Stalactitic*,

3. *Allomorphite*,

4. *Calcareobarite*,

5. *Celestobarite*,

6. *Calstronbarite*,

7. *Schoarite*.

2. *Fetid*,

ALTERS TO :—*Calcite*, *Siderite*, *Cerussite*, *Quartz*, *Limonite*, *Hematite*, *Pyrite*, *Psilomelane*, *Göthite*.

RELATED :—*Leedsite*, *Dreelite*, *Eggonite*.

720. Celestite. Orthorhombic; strontium sulphate, SrSO_4 .

VARIETIES :—

1. *Ordinary* :—

(a) *Crystals*,

(b) *Fibrous*,

(c) *Lamellar*,

(d) *Granular*,

(e) *Concretionary*.

(f) *Earthy*,

2. *Calciocelstite*,

3. *Barytocelestite*.

721. Anglesite. Orthorhombic; lead sulphate, PbSO_4 .

ALTERS TO :—*Cerussite*, *Mimetite* (?), *Hydrous Anglesite*.

722. Anhydrite. Orthorhombic; anhydrous calcium sulphate, CaSO_4 .

VARIETIES :—

1. *Ordinary* :—

(a) *Crystallized*,

(b) *Fibrous*,

(c) *Fine granular*,

(d) *Scaly granular (Vulpinite)*.

2. *Pseudomorphous; in cubes after rock-salt*.

723. **Zinkosite.** Orthorhombic; anhydrous zinc sulphate, ZnSO_4 .
 724. **Hydrocyanite.** Orthorhombic; cupric sulphate, CuSO_4 .
 725. **Crocoite.** Monoclinic; lead chromate, PbCrO_4 .
 726. **Phœnicochroite.** Orthorhombic(?); basic lead chromate, $3\text{PbO} \cdot 2\text{CrO}_3$.
 727. **Vauquelinite.** Monoclinic; a lead phospho-chromate, perhaps $2(\text{Pb,Cu})\text{CrO}_4 \cdot (\text{Pb,Cu})_3\text{P}_2\text{O}_8$.
 RELATED :—*Jossaite, Tarapacaité, Calcium chromates, Sulphates of mercury.*

SULPHATES WITH CHLORIDES, CARBONATES, ETC.—IN PART HYDROUS.

728. **Sulphohalite.** Isometric; sodium sulphate and chloride, $3\text{Na}_2\text{SO}_4 \cdot 2\text{NaCl}$.
 729. **Caracolite.** Orthorhombic(?); perhaps a basic lead chloride and sodium sulphate, $\text{Pb}(\text{OH})\text{Cl} \cdot \text{Na}_2\text{SO}_4$.
 RELATED :—*Chlorothionite.*
 730. **Kainite.** Monoclinic; a hydrous magnesium and potassium chlor-sulphate, $\text{MgSO}_4 \cdot \text{KCl} + 3\text{H}_2\text{O}$.
 731. **Connellite.** Hexagonal; a hydrous basic copper chlor-sulphate, probably $\text{Cu}_{15}(\text{Cl},\text{OH})_2\text{SO}_{16} \cdot 15\text{H}_2\text{O}$.
 732. **Spangolite.** Rhombohedral; a basic aluminium and copper chlor-sulphate, $(\text{AlCl})\text{SO}_4 \cdot 6\text{Cu}(\text{OH})_2 + 3\text{H}_2\text{O}$.
 733. **Hanksite.** Hexagonal; sodium sulphato-carbonate, $4\text{Na}_2\text{SO}_4 \cdot \text{Na}_2\text{CO}_3$.
 734. **Leadhillite.** Monoclinic; a lead sulphato-carbonate, $4\text{PbO} \cdot \text{SO}_3 \cdot 2\text{CO}_2 \cdot \text{H}_2\text{O}$ (?).
 RELATED :—*Susannite.*

B. ACID AND BASIC SULPHATES.

735. **Misenite.** Fibers; acid potassium sulphate(?), KHSO_4 .
 736. **Alumian.** Rhombohedral(?); an aluminium sulphate, $\text{Al}(\text{AlO})(\text{SO}_4)_2$ (?).
 737. **Lanarkite.** Monoclinic; basic lead sulphate, $\text{PbSO}_4 \cdot \text{PbO}$.
 738. **Dolerophanite.** Monoclinic; a basic cupric sulphate, probably $2\text{CuO} \cdot \text{SO}_3$.
 739. **Caledonite.** Orthorhombic; basic lead and copper sulphate, perhaps $2(\text{Pb,Cu})\text{O} \cdot \text{SO}_3 \cdot \text{H}_2\text{O}$.
 740. **Brochantite.** Orthorhombic; basic copper sulphate, $4\text{CuO} \cdot \text{SO}_3 \cdot 3\text{H}_2\text{O}$.
 VARIETIES :—1. *Ordinary crystals*; 2. *Waringtonite.*
 741. **Linarite.** Monoclinic; basic lead and copper sulphate, $\text{PbO} \cdot \text{CuO} \cdot \text{SO}_3 \cdot \text{H}_2\text{O}$.
 RELATED :—*Antlerite.*

C. HYDROUS SULPHATES.—NORMAL DIVISION.

742. **Lecontite.** Orthorhombic; hydrous sodium, ammonium and potassium sulphate, $(\text{Na},\text{NH}_4,\text{K})_2\text{SO}_4 + 2\text{H}_2\text{O}$.
 RELATED :—*Guanovulite.*
 743. **Mirabilite.** Monoclinic; hydrous sodium sulphate, $\text{Na}_2\text{SO}_4 + 10\text{H}_2\text{O}$.
 RELATED :—*Exanthalose.*
 744. **Kieserite.** Monoclinic; hydrous magnesium sulphate, $\text{MgSO}_4 + \text{H}_2\text{O}$.
 RELATED :—*Abraun salts.*
 745. **Szmkite.** Amorphous; hydrous manganese sulphate, $\text{MnSO}_4 + \text{H}_2\text{O}$.
 746. **Gypsum.** Monoclinic; hydrous calcium sulphate, $\text{CaSO}_4 + 2\text{H}_2\text{O}$.

VARIETIES :—

- | | |
|------------------------------------|----------------------------------|
| 1. <i>Crystallized (Selenite),</i> | 3. <i>Massive (a) Alabaster,</i> |
| 2. <i>Fibrous (a) Satin spar,</i> | (b) <i>Scaly-granular,</i> |
| (b) <i>Plumose,</i> | (c) <i>Rock-gypsum.</i> |

ALTERS TO :—*Calcite, Malachite, Quartz, Anhydrite.*

747. **Ilesite.** Monoclinic (?); a hydrous manganese, zinc and iron sulphate, $(\text{Mn,Zn,Fe})\text{SO}_4 + 4\text{H}_2\text{O}$.
 748. **Epsomite.** Orthorhombic; hydrous magnesium sulphate, $\text{MgSO}_4 + 7\text{H}_2\text{O}$.
 RELATED :—*Tauriscite.*
 749. **Goslarite.** Orthorhombic; hydrous zinc sulphate, $\text{ZnSO}_4 + 7\text{H}_2\text{O}$.
 750. **Morenosite.** Orthorhombic; hydrous nickel sulphate, $\text{NiSO}_4 + 7\text{H}_2\text{O}$.
 RELATED :—*Tectite, Fauserite.*

MELANTERITE OR COPPERAS GROUP. Monoclinic.

751. **Melanterite.** Monoclinic; hydrous ferrous sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$.

RELATED :—*Bourbolite*.

752. **Mallardite.** Monoclinic; hydrous manganese sulphate, $\text{MnSO}_4 \cdot 7\text{H}_2\text{O}$.

753. **Pisanite.** Monoclinic; hydrous iron and copper sulphate, $(\text{Fe,Cu})\text{SO}_4 \cdot 7\text{H}_2\text{O}$.

754. **Bieberite.** Monoclinic; hydrous cobalt sulphate, $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$.

RELATED :—*Cupromagnesite*.

755. **Chalcanthite.** Triclinic; hydrous cupric sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.

756. **Syngenite.** Monoclinic; hydrous calcium and potassium sulphate, $\text{CaSO}_4 \cdot \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$.

757. **Löweite.** Tetragonal; hydrous magnesium and sodium sulphate, $\text{MgSO}_4 \cdot \text{Na}_2\text{SO}_4 + 2\frac{1}{2}\text{H}_2\text{O}$.

758. **Blödite.** Monoclinic; hydrous magnesium and sodium sulphate, $\text{MgSO}_4 \cdot \text{Na}_2\text{SO}_4 + 4\text{H}_2\text{O}$.

VARIETIES :—1. *Ordinary*, 2. *Astrakanite*.

759. **Boussingaultite.** Monoclinic; a hydrous ammonium and magnesium sulphate, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{MgSO}_4 + 6\text{H}_2\text{O}$.

760. **Picromerite.** Monoclinic; hydrous magnesium and potassium sulphate, $\text{MgSO}_4 \cdot \text{K}_2\text{SO}_4 + 6\text{H}_2\text{O}$.

761. **Cyanochroite.** Monoclinic; hydrous copper and potassium sulphate, $\text{CuSO}_4 \cdot \text{K}_2\text{SO}_4 + 6\text{H}_2\text{O}$.

762. **Polyhalite.** Monoclinic (?); hydrous calcium, magnesium and potassium sulphate, $2\text{CaSO}_4 \cdot \text{MgSO}_4 \cdot \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$.

RELATED :—*Krugite*, *Mamanite*.

763. **Wattevillite.** Orthorhombic or monoclinic; a hydrous calcium and sodium sulphate, $\text{CaSO}_4 \cdot \text{Na}_2\text{SO}_4 + 4\text{H}_2\text{O}$.

ALUM AND HALOTRICHITE GROUPS.

764. **Kalinite.** Isometric; hydrous aluminium and potassium sulphate, $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$.

765. **Tschermigite.** Isometric; hydrous aluminium and ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$.

766. **Mendozite.** Fibrous; hydrous aluminium and sodium sulphate, $\text{Na}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$.

767. **Tamarugite.** Fibrous; hydrous aluminium and sodium sulphate, $\text{Na}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 12\text{H}_2\text{O}$.

768. **Pickeringite.** Monoclinic (?); hydrous aluminium and magnesium sulphate, $\text{MgSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 22\text{H}_2\text{O}$.

RELATED :—*Stüvenite*, *Sonomaite*, *Picroallumogene*, *Dumreicherite*, *Aronite*.

769. **Halotrichite.** Monoclinic or triclinic; hydrous iron and aluminium sulphate, $\text{FeSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$.

770. **Apjohnite.** Monoclinic (?); hydrous aluminium and manganese sulphate, $\text{MnSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 24\text{H}_2\text{O}$.

VARIETIES :—1. *Ordinary*, 2. *Bushmanite*.

771. **Dietrichite.** Monoclinic (?); hydrous zinc, iron, manganese and aluminium sulphate, $(\text{Zn,Fe,Mn})\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 + 22\text{H}_2\text{O}$.

772. **Coquimbite.** Rhomb.; a hydrous ferric iron sulphate, $\text{Fe}_2(\text{SO}_4)_3 + 9\text{H}_2\text{O}$.

773. **Quenstedtite.** Monoc.; a hydrous ferric iron sulphate, $\text{Fe}_2\text{O}_3 \cdot 3\text{SO}_3 \cdot 10\text{H}_2\text{O}$.

774. **Ihlöite.** Efflorescence; hydrous ferric iron sulphate, $\text{Fe}_2(\text{SO}_4)_3 + 12\text{H}_2\text{O}$.

RELATED :—*Kornelite*.

775. **Alunogen.** Monoclinic; hydrous aluminium sulphate, $\text{Al}_2(\text{SO}_4)_3 + 18\text{H}_2\text{O}$.

776. **Kröhnkite.** Monoclinic; hydrous copper and sodium sulphate, $\text{CuSO}_4 \cdot \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$.

RELATED :—*Phillipite*.

777. **Ferronatrite.** Rhombohedral; hydrous iron and sodium sulphate, $3\text{Na}_2\text{O} \cdot \text{Fe}_2\text{O}_3 \cdot 6\text{SO}_3 \cdot 6\text{H}_2\text{O}$.

778. **Römerite.** Triclinic; hydrous ferrous and ferric iron sulphate, perhaps $\text{FeSO}_4 \cdot \text{Fe}_2(\text{SO}_4)_3 + 12\text{H}_2\text{O}$.

C. HYDROUS SULPHATES.—BASIC DIVISION.

779. **Langite.** Orthorhombic; hydrous basic copper sulphate, $4\text{CuO} \cdot \text{SO}_3 \cdot 4\text{H}_2\text{O}$.

RELATED :—*Woodwardite*.

780. **Herrengrundite**. Monoclinic; hydrous basic copper and calcium sulphate, $\text{CaO} \cdot 4\text{CuO} \cdot 2\text{SO}_3 \cdot 6\text{H}_2\text{O}$.
- 780A. **Arnimite**. Acicular; a hydrous basic copper sulphate, $5\text{CuO} \cdot 2\text{SO}_3 \cdot 6\text{H}_2\text{O}$.
781. **Cyanotrichite (Lettsomite)**. Orthorhombic; a hydrous basic copper and aluminium sulphate, $4\text{CuO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SO}_3 \cdot 8\text{H}_2\text{O}$.
782. **Serpierite**. Orthorhombic; a basic copper and zinc sulphate.
783. **Castanite**. Monoclinic; hydrous basic ferric iron sulphate, $\text{Fe}_2\text{O}_3 \cdot 2\text{SO}_3 \cdot 8\text{H}_2\text{O}$.
RELATED:—*Rubrite*.
784. **Copiapite**. Monoclinic; a hydrous basic ferric iron sulphate, perhaps $2\text{Fe}_2\text{O}_3 \cdot 5\text{SO}_3 \cdot 18\text{H}_2\text{O}$.
785. **Knoxvillite**. Orthorhombic (?); a hydrous basic chromium, iron and aluminium sulphate, $3([\text{Fe} \cdot \text{Mg}]\text{O}) \cdot 4([\text{Fe}, \text{Cr}, \text{Al}]_2\text{O}_3) \cdot 9\text{SO}_3 \cdot 30\text{H}_2\text{O}(?)$.
RELATED:—*Redingtonite*.
786. **Utahite**. Rhomb. ; a hydrous basic ferric iron sulphate, $3\text{Fe}_2\text{O}_3 \cdot 3\text{SO}_3 \cdot 4\text{H}_2\text{O}$.
787. **Amarantite**. Tric. ; a hydrous basic ferric iron sulphate, $\text{Fe}_2\text{O}_3 \cdot 2\text{SO}_3 \cdot 7\text{H}_2\text{O}$.
RELATED:—*Hohmannite*, *Paposite*, *Ferric sulphates*.
788. **Fibroferrite**. Monoclinic(?); a hydrous basic ferric iron sulphate, $\text{Fe}_2\text{O}_3 \cdot 2\text{SO}_3 \cdot 10\text{H}_2\text{O}$.
789. **Raimondite**. Hexagonal or rhombohedral; a hydrous basic ferric iron sulphate, $2\text{Fe}_2\text{O}_3 \cdot 3\text{SO}_3 \cdot 7\text{H}_2\text{O}$.
RELATED:—*Pastreite*, *Aptelite*.
790. **Carphosiderite**. Rhombohedral(?); a hydrous basic ferric iron sulphate, perhaps $3\text{Fe}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 10\text{H}_2\text{O}$.
791. **Aluminite**. Monoclinic; a hydrous aluminium sulphate, $\text{Al}_2\text{O}_3 \cdot \text{SO}_3 \cdot 2\text{H}_2\text{O}$.
RELATED:—*Werthemanite*, *Winebergite*.
792. **Glockerite**. Massive; a hydrous basic ferric iron sulphate, $2\text{Fe}_2\text{O}_3 \cdot \text{SO}_3 \cdot 6\text{H}_2\text{O}$.
793. **Felsöbanyite**. Orthorhombic; a hydrous basic aluminium sulphate, $2\text{Al}_2\text{O}_3 \cdot \text{SO}_3 \cdot 10\text{H}_2\text{O}$.
794. **Paraluminite**. Massive; a hydrous basic aluminium sulphate, $2\text{Al}_2\text{O}_3 \cdot \text{SO}_3 \cdot 15\text{H}_2\text{O}(?)$.
RELATED:—*Pissophanite*.
795. **Cyprusite**. Hexagonal(?); a hydrous ferric iron and aluminium sulphate, perhaps $7\text{Fe}_2\text{O}_3 \cdot \text{Al}_2\text{O}_3 \cdot 10\text{SO}_3 \cdot 14\text{H}_2\text{O}$.
RELATED:—*Erusibite*.
796. **Voltaite**. Isometric(?); a hydrous iron, magnesium and aluminium sulphate, $(\text{Fe}, \text{Mg})_5(\text{Fe}, \text{Al})_4\text{S}_{10}\text{O}_{41} \cdot 15\text{H}_2\text{O}(?)$.
RELATED:—*Pettkoite*.
797. **Metavoltine**. Hexagonal; a hydrous sodium, potassium and iron sulphate, perhaps $5(\text{K}_2, \text{Na}_2, \text{Fe})\text{O} \cdot 3\text{Fe}_2\text{O}_3 \cdot 12\text{SO}_3 \cdot 18\text{H}_2\text{O}$.
798. **Botryogen**. Monoclinic or triclinic (?); a hydrous magnesium, ferrous and ferric iron sulphate, perhaps $\text{MgO} \cdot \text{FeO} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 18\text{H}_2\text{O}$.
799. **Sideronatrite**. Orthorhombic; a hydrous sodium and ferric iron sulphate, $2\text{Na}_2\text{O} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 7\text{H}_2\text{O}$.
800. **Alunite**. Rhombohedral; hydrous aluminium and potassium sulphate, $\text{K}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 6\text{H}_2\text{O}$.
801. **Jarosite**. Rhombohedral; hydrous potassium and ferric iron sulphate, $\text{K}_2\text{O} \cdot \text{Fe}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 6\text{H}_2\text{O}$.
VARIETIES:—1. *Crystallized*, 2. *Concretionary*.
RELATED:—*Bartholomite*, *Plagiocitrite*, *Clinophæite*, *Clinocrocite*.
802. **Löwigite**. Rounded masses; hydrous potassium and aluminium sulphate, perhaps $\text{K}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 4\text{SO}_3 \cdot 9\text{H}_2\text{O}$.
RELATED:—*Ignatievite*.
803. **Ettringite**. Hexagonal; hydrous calcium and aluminium sulphate, perhaps $6\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{SO}_3 \cdot 33\text{H}_2\text{O}$.
804. **Quetenite**. Monoclinic or triclinic (?); a hydrous magnesium and iron sulphate, $\text{MgO} \cdot \text{Fe}_2\text{O}_3 \cdot 3\text{SO}_3 \cdot 13\text{H}_2\text{O}$.
805. **Zincaluminite**. Hexagonal (?); a hydrous basic zinc and aluminium sulphate, $6\text{ZnO} \cdot 3\text{Al}_2\text{O}_3 \cdot 2\text{SO}_3 \cdot 18\text{H}_2\text{O}$.
RELATED:—*Enysite*, *Lamprophanite*.
806. **Johannite**. Monoclinic; a hydrous uranium and copper sulphate.
807. **Uranopilite**. Incrustation of minute crystals; a hydrous basic calcium and uranium sulphate, perhaps $\text{CaO} \cdot 8\text{UO}_3 \cdot 2\text{SO}_3 \cdot 25\text{H}_2\text{O}$.
RELATED:—*Medjilite*, *Uranochalcite*, *Zippelite*, *Voglianite*, *Uraconite*.

TELLURATES; ALSO TELLURITES, SELENITES.

808. **Montanite**. Incrusting; a hydrous bismuth tellurate, $\text{Bi}_2\text{O}_3 \cdot \text{TeO}_3 \cdot 2\text{H}_2\text{O}$.
 809. **Emmonsite**. Monoclinic; probably a hydrous ferric iron tellurite.
 810. **Durdenite**. Massive; hydrous ferric iron tellurite, $\text{Fe}_2\text{O}_3 \cdot 3\text{TeO}_2 \cdot 4\text{H}_2\text{O}$.
 RELATED :—*Ferrotellurite*, *Magnolite*.
 811. **Chalcomenite**. Monoclinic; hydrous cupric selenite, $\text{CuO} \cdot \text{SeO}_2 \cdot 2\text{H}_2\text{O}$.
 RELATED :—*Molybdomenite*, *Cobaltomenite*, *Kerstenite*, *Onofrite*.

7. Tungstates, Molybdates.

812. **Wolframite**. Monoclinic; an iron and manganese tungstate, $(\text{Fe}, \text{Mn})\text{WO}_4$.
 ALTERS TO :—*Scheelite*.
 RELATED :—*Ferberite*.
 813. **Hübnerite**. Monoclinic; a manganese tungstate, MnWO_4 .

SCHEELITE GROUP. Tetragonal.

814. **Scheelite**. Tetragonal; calcium tungstate, CaWO_4 .
 ALTERS TO :—*Wolframite*, *Kaolinite*.
 815. **Cuprotungstite**. Granular and crusts; copper tungstate, CuWO_4 ; also copper and calcium tungstate, $(\text{Ca}, \text{Cu})\text{WO}_4$.
 816. **Powellite**. Tetragonal; essentially calcium molybdate, CaMoO_4 .
 817. **Stolzite**. Tetragonal; lead tungstate, PbWO_4 .
 818. **Wulfenite**. Tetragonal; lead molybdate, PbMoO_4 .
 819. **Reinite**. Tetragonal; iron tungstate, FeWO_4 .
 RELATED :—*Pateraite*, *Eosite*, *Achrematite*.
 820. **Belonesite**. Tetragonal; probably magnesium molybdate, MgMoO_4 .

VII. SALTS OF ORGANIC ACIDS.

OXALATES, MELLATES.

821. **Whewellite**. Monoclinic; calcium oxalate, $\text{CaC}_2\text{O}_4 + \text{H}_2\text{O}$.
 RELATED :—*Thierschite*.
 822. **Oxammite**. Orthorhombic; ammonium oxalate, $(\text{NH}_4)_2\text{C}_2\text{O}_4 + 2\text{H}_2\text{O}$.
 823. **Humboldtine**. Capillary; hydrous ferrous iron oxalate, $2\text{FeC}_2\text{O}_4 + 3\text{H}_2\text{O}$.
 RELATED :—*Oxalate of sodium and ammonium*.
 824. **Mellite**. Tetragonal; hydrous aluminium mellate, $\text{Al}_2\text{C}_{12}\text{O}_{12} + 18\text{H}_2\text{O}$.
 RELATED :—*Pigotite*, *Organic salts of iron*.

VIII. HYDROCARBON COMPOUNDS.

The Hydrocarbon compounds in general, with perhaps a few exceptions, are not homogeneous substances, but mixtures, which by the action of solvents or by fractional distillation may be separated into two or more component parts.

1. SIMPLE HYDROCARBONS.

Chiefly members of the Paraffin Series $\text{C}_n\text{H}_{2n+2}$.

- Scheererite**. Monoclinic; carbon 73%, hydrogen 24%, probably a polymer of marsh gas.
Hatchettite. Massive; carbon 85.55%, hydrogen 14.45%.
 RELATED :—*Paraffin*, *Chrismatite*.
Ozocerite. Waxy; chiefly a higher paraffin, carbon 84.43%, hydrogen 13.69%.
 RELATED :—*Zietrisikite*, *Urpethite*, *Baikerinite*, *Neft-gil*, *Pyropissite*, *Helenite*.
Fichtelite. Monoclinic; formula doubtful, $\text{C}_{15}\text{H}_{36}$ to $\text{C}_{15}\text{H}_{28}$.

Hartite. Triclinic or monoclinic; ratio of C to H=12:20.

RELATED:—*Dinité, Exolyte, Napalite.*

Könlite. Amorphous; ratio of C to H=1:1, a polymer of benzene.

RELATED:—*Phylloretin, Naphthalene.*

2. OXYGENATED HYDROCARBONS.

Comprise chiefly the numerous kinds of native fossil resins often designated by the general term "Ambers."

Succinite (True Amber). Irregular masses; ratio of C,H,O=40:64:4.

RELATED:—*Succinellite.*

Retinite. A generic name, under which are included the following amber-like resins. They contain little or no succinic acid.

<i>Gedanite,</i>	<i>Duxite,</i>	<i>Bucaramangite,</i>
<i>Glessite,</i>	<i>Muckite,</i>	<i>Rosthornite,</i>
<i>Rumänite,</i>	<i>Neudorfite,</i>	<i>Copalite,</i>
<i>Simetite,</i>	<i>Schraufite,</i>	<i>Ambrosine,</i>
<i>Krantzite,</i>	<i>Jaulingite,</i>	<i>Ajkite,</i>
<i>Siegburgite,</i>	<i>Refikite,</i>	<i>Wheelerite,</i>
<i>Walchowite,</i>	<i>Köflachite,</i>	<i>Ionite,</i>
<i>Chemawinité,</i>	<i>Ambrite,</i>	<i>Euosmite.</i>

Bathvillite. Amorphous; ratio of C,H,O=40:68:4.

RELATED:—

<i>Torbanite,</i>	<i>Xyloretinite,</i>	<i>Guyaquillite,</i>
<i>Retinellite,</i>	<i>Scleretinite,</i>	<i>Middletonite.</i>

Tasmanite. Resiniferous shale; carbon 79.34 %, hydrogen 10.41 %, oxygen 4.93 %, sulphur 5.32 %.

RELATED:—*Trinkerite.*

Dysodile. Thin leaves; carbon 69 %, hydrogen 10 %, oxygen 16.9 %, sulphur 2.35 %, nitrogen 1.7 %.

Pyroretinite. Resin-like; carbon 80 %, hydrogen 9.33 %, oxygen 10.67 %.

RELATED:—*Stanekite, Reussinite.*

Leucopetrite. Between resin and wax in characters; $C_{50}H_{84}O_3$.

RELATED:—*Brücknerellite, Anthracoxenite.*

Geomyricite. Wax-like; $C_{31}H_{65}O_2$.

Geocerite. Wax-like; $C_{28}H_{56}O_2$.

RELATED:—*Geocerellite.*

Bombiccite. Triclinic; C_7H_{13} .

RELATED:—*Hofmannite.*

Idrialite. Crystalline when pure; $C_{80}H_{56}O_2$.

RELATED:—*Aragotite, Posepnyte.*

Rochlederite. Resin-like; carbon 76.79 %, hydrogen 9.06 %, oxygen 14.15 %.

RELATED:—*Native humus acid, Hircite.*

Dopplerite. Amorphous; $C_{12}H_{14}O_6$.

RELATED:—*Phytocollite.*

APPENDIX TO HYDROCARBONS.

Petroleum. Liquid; chiefly consists of members of the paraffin series, C_nH_{2n+2} .

RELATED:—*Naphtha, Pittasphalt, Petrolene.*

Asphaltum. Amorphous; composition variable.

Elaterite. Massive; about 85 % carbon, 12-13 % hydrogen.

RELATED:—*Settling stones resin, Berengebite, Bielzite, Pianzite, Wurtzilite, Albertite, Cloustonite, Grahamite, Uintahite.*

Mineral Coal. Compact massive; mainly oxygenated hydrocarbons.

1. *Anthracite*.

2. *Bituminous*;—

- Caking or coking coal,*
- Non-caking coal,*
- Cannel coal,*
- Brown coal.*

RELATED:—*Byerite, Huminite, Anthraxolite, Wollongongite.*

Complete Supplement to Dana's Classification.

NEW MINERALS

The following list includes new minerals described in the Supplement and in Appendix I. of Dana's *System of Mineralogy* (6th ed.)

The relative importance of the new names is approximately indicated by the type used.

Adelite. Massive; a basic calcium and magnesium arsenate, $\text{H}_2\text{O} \cdot 2\text{CaO} \cdot 2\text{MgO} \cdot \text{As}_2\text{O}_5$.

Aguilarite. Isometric; silver sulpho-selenide, $\text{Ag}_2\text{S} \cdot \text{Ag}_2\text{Se}$.

Alexandrolite. Amorphous; contains H_2O , Al_2O_3 , SiO_2 , Cr_2O_3 .

Andorite. Orthorhombic; sulphantimonite of lead and silver. $2\text{PbS} \cdot \text{Ag}_2\text{S} \cdot 3\text{Sb}_2\text{S}_3$.

Ascharite. Massive; a hydrous magnesium borate.

Astochite. Monoclinic; basic potassium, sodium, calcium, magnesium and manganese silicate, $(\text{Mg}, \text{Mn}, \text{Ca})\text{SiO}_3 + (\text{Na}, \text{K}, \text{H})_2\text{Si}_2$, (amphibole).

Baddeckite. Sealy; a ferruginous muscovite. Silicate of aluminium, iron, etc.

Baddeleyite. Monoclinic (?); zirconium dioxide, ZrO_2 .

Barracanite. Cupropyrrite, CuFe_2S_4 . Near Cubanite.

Bataquite. Scales; silicate of magnesium, aluminium, etc.

Beaumontite. A fibrous talc. Pseudomorphous (?); $\text{H}_2(\text{Mg}, \text{Fe})_3(\text{SiO}_4)_3$.

Beresovite. Crystalline; chromate and carbonate of lead, $6\text{PbO} \cdot 3\text{CrO}_3 \cdot \text{CO}_2$.

Bismutosmaltite. Isometric; a skutterudite containing bismuth, $\text{Co}(\text{As}, \text{Bi})_4$.

Bixbyite. Isometric; mainly iron and manganese oxide, $\text{FeO} \cdot \text{MnO}_2$.

Bliabergite. Orthorhombic; hydrous iron, aluminium and manganese silicate.

Bolélite. Isometric; a hydrous lead and copper oxychloride with some silver chloride, $\text{Pb}, \text{CuCl}_2(\text{OH})_2 + \frac{1}{2}\text{AgCl}$.

Canfieldite. Isometric; sulphide of silver, tin and germanium, $4\text{Ag}_2\text{S} \cdot (\text{SnGe})\text{S}_2$.

Carnotite. A crystalline powder containing uranium and vanadium, $\text{K}_2\text{O} \cdot 2\text{U}_2\text{O}_5 \cdot \text{V}_2\text{O}_5 \cdot 3\text{H}_2\text{O}$. (?)

Cataphorite. An alkali-iron amphibole, between Arfvedsonite and Barkevikite.

Celsian. Triclinic; barium feldspar, near Anorthite, $\text{BaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$.

Clinohedrite. Monoclinic-clinohedral; a basic calcium zinc silicate, $(\text{ZnOH})(\text{CaOH})\text{SiO}_3$.

Clinozoisite. Monoclinic; near Zoisite in composition.

Cosmochlore. Monoclinic (?); a chromium silicate. (Meteoric).

Crossite. An aluminium, iron, magnesium and sodium silicate.

Cubeite. Monoclinic (?); an iron sulphate containing SO_3 , Fe_2O_3 , MgO , H_2O .

Cumengite. Tetragonal; hydrous lead and copper oxychloride, $\text{PbCl}_2 \cdot \text{CuO} \cdot \text{H}_2\text{O}$.

Cuprocassiterite. Supposed new tin mineral.

Cuproidargyrite. Incrusting; a copper and silver iodide, $\text{CuI}.\text{AgI}$.

Cylindrite. Massive; a lead sulphantimonate and sulpho-stannate, $3\text{PbS}.\text{Sb}_2\text{S}_3+3(\text{PbS}.2\text{SnS}_2)$.

Derbylite. Orthorhombic; an antimonio-titanate of iron, perhaps $6\text{FeO}.5\text{TiO}_2.\text{Sb}_2\text{O}_3$.

Dietzeite. Monoclinic; a calcium iodate and chromate, $7\text{Ca}(\text{IO}_3)_2.8\text{CaCrO}_4$.

Elpidite. Hydrous zirconium and sodium silicate, $\text{Na}_2\text{O}.\text{ZrO}_2.6\text{SiO}_2.3\text{H}_2\text{O}$.

Epididymite. Monoclinic; a basic sodium and beryllium silicate, $\text{H}_2\text{O}.\text{Na}_2\text{O}.\text{BeO}.6\text{SiO}_2$.

Erionite. Orthorhombic; an impure hydrous aluminium silicate, $\text{CaO}.\text{K}_2\text{O}.\text{Na}_2\text{O}.\text{Al}_2\text{O}_3.6\text{SiO}_2.6\text{H}_2\text{O}$.

Falkenhaynite. Massive; a copper sulphantimonite (?), $3\text{Cu}_2\text{S}.\text{Sb}_2\text{S}_3$.

Fedorovite. Between Aegirite-Augite and Aegirite.

Footite. Monoclinic; a hydrous basic copper chloride, perhaps $8\text{Cu}(\text{OH})_2.\text{CuCl}_2+4\text{H}_2\text{O}$.

Fouquéite. Monoclinic; a basic aluminium, calcium and iron ortho-silicate (essentially an epidote, with but little iron).

Franckeite. Fibrous; a sulphostannite of lead and antimony, $5\text{PbS}.\text{Sb}_2\text{S}_3.2\text{Sn}_4$.

Fuggerite. Calcium and aluminium sulphate (?).

Geikielite. Magnesium titanate, $\text{MgO}.\text{TiO}_2$.

Glaucocroite. Orthorhombic; a calcium manganese silicate, CaMnSiO_4 .

Goldschmidtite. Monoclinic; a gold and silver telluride, Au_2AgTe_6 .

Gonnardite. Orthorhombic (?); a hydrous aluminium silicate, $(\text{Ca},\text{Na})_2\text{Al}_2\text{Si}_5\text{O}_{15}+5\frac{1}{2}\text{H}_2\text{O}$.

Grunlingite. Rhombohedral (?), bismuth sulphide and telluride, Bi_4TeS_3 .

Hainite. Triclinic; a silicate of sodium, calcium, titanium and zirconium.

Hancockite. Monoclinic; a silicate of aluminium, ferric iron, lead, calcium and strontium.

Hardystonite. Tetragonal; a silicate of calcium and zinc, $2\text{CaO}.\text{ZnO}.2\text{SiO}_2$.

Hastingsite. An amphibole with composition of an orthosilicate, analogous to garnet.

Hauecorinite. Tetragonal; essentially nickel, bismuth, antimony and sulphur. $(\text{Ni},\text{Co})_7.(\text{S},\text{Bi},\text{Sb})_8$.

Hessenbergite. Monoclinic; a silicate, exhaustively described crystallographically, but constituents undetermined.

Hoeferite. Amorphous; a hydrated ferric silicate, $2\text{Fe}_2\text{O}_3.4\text{SiO}_2.7\text{H}_2\text{O}$. (?)

Hydrobucholite. A hydrous aluminium silicate with some calcium sulphate.

Hydrocalcite. Needles; a hydrous calcium carbonate, perhaps $\text{CaCO}_3+2\text{H}_2\text{O}$.

Hydrosamarskite. A hydrated "gadolinite-earth" samarskite.

Idrizite. Compact to crystalline; a hydrous iron aluminium silicate, $(\text{Mg},\text{Fe})(\text{Fe},\text{Al})_2\text{Si}_5\text{O}_{15}+16\text{H}_2\text{O}$.

Josephinite. Massive; an iron-nickel, Fe_2Ni_3 .

Kalgoorlite. Massive; a mercury telluride of gold and silver, $\text{HgAu}_2\text{Ag}_6\text{Te}_8$.

Kallilite. Massive; a nickel sulpho-bismuthide, $\text{NiS}_2.\text{NiBi}_2$.

Kamarevite. Crystalline; a hydrated copper sulphate, $(\text{CuOH})_2\text{SO}_4.\text{Cu}(\text{OH})_2+6\text{H}_2\text{O}$ (?).

Karamsinite. Probably calcium, magnesium, potassium, iron, manganese, aluminium and copper silicate.

Kehoeite. Amorphous; a hydrous zinc and aluminium phosphate, $\text{ZnO}.4\text{Al}_2\text{O}_3.5\text{P}_2\text{O}_5.9\text{H}_2\text{O}$.

- Knopite.** Isometric (?); near perovskite, but contains cerium.
- Ktypeite.** Calcium carbonate in form of pisolites.
- Lamprophyllite.** Flattened prisms; contains silica, titanium, iron, manganese and sodium. Related to astrophyllite.
- Langbeinite.** Isometric-tetartohedral; a magnesium and potassium sulphate, $K_2SO_4 \cdot 2MgSO_4$.
- Lautarite.** Monoclinic; calcium iodate, $Ca(IO_3)_2$.
- Lawsonite.** Orthorhombic; a basic calcium and aluminium silicate, $H_4CaAl_2Si_2O_{10}$.
- Lembergite.** Artificial; silicate of aluminium and sodium, $5Na_2Al_2Si_2O_9 + 4H_2O$.
- Leonite.** Monoclinic; hydrous magnesium and potassium sulphate, $MgSO_4 \cdot K_2SO_4 + 4H_2O$.
- Lewisite.** Isometric; a calcium and iron titano-antimonate, $5CaO \cdot 3Sb_2O_3 \cdot 2TiO_2$ (?).
- Lorandite.** Monoclinic; a thallium sulpharsenide, $Tl_2S \cdot As_2S_3$.
- Lossenite.** Pyramids; contains lead sulphate, iron, arsenic and water, $2PbSO_4 \cdot 3(FeOH)_2As_2O_8 + 12H_2O$ (?).
- Lutecite.** See Quartzine.
- Mackintoshite.** Tetragonal; mainly oxides of silicon, uranium, thorium and water, $UO_2 \cdot 3ThO_2 \cdot 3SiO_2 \cdot 3H_2O$.
- Manganandalusite.** An andalusite, containing Mn_2O_3 .
- Manganberzelite.** A name given to pyrrharsenite, a variety of Berzeliite.
- Manganoferrite.** An iron and manganese oxide $(FeMn)_3O_4$, formed in some furnace slags.
- Marshite.** Tetragonal; probably copper iodide, Cu_2I_2 .
- Mauzeilite.** Isometric; essentially a calcium titano-antimonate, $4(Ca,Pb)O \cdot TiO_2 \cdot 2Sb_2O_3$.
- Metadesmine.** A dehydrated stilbite.
- Metanocerine.** Near nocerite.
- Metascolesite.** Scolesite altered by moderate heating.
- Miersite.** Isometric-tetrahedral; essentially silver iodide, Ag_2I_2 .
- Minervite.** Aluminium phosphate, $Al_2O_3 \cdot P_2O_5 \cdot 7H_2O$.
- Mitchellite.** A magnesian chromite, $2MgAl_2O_4 \cdot MgCr_2O_4 \cdot FeCr_2O_4$.
- Morinite.** Monoclinic; contains sodium, aluminium and phosphoric acid.
- Mossite.** Tetragonal; tantalum-niobate of iron, $Fe(Nb,Ta)_2O_6$.
- Mursinskite.** Tetragonal.
- Nasonite.** Monoclinic (?); massive, essentially a lead silicate, $(Ca,Pb)_{10}Cl_2Si_6O_{21}$.
- Neptunite.** Monoclinic; sodium and potassium silicate and iron and manganese titanate, $(\frac{2}{3}Na + \frac{1}{3}K)Si_4O_8 + (\frac{2}{3}Fe + \frac{1}{3}Mn)TiO_3$ (?).
- Nickel.** An iron-nickel alloy, Ni_3Fe .
- Nickel-skutterudite.** Granular; a nickel, cobalt and iron tri-arsenide, $(NiCo,Fe)As_3$.
- Northupite.** Isometric; a magnesium and sodium carbonate and sodium chloride, $MgCO_3 \cdot Na_2CO_3 \cdot NaCl$.
- Offretite.** Hexagonal or rhombohedral; hydrous potassium, calcium and aluminium silicate, $(K,Ca)_2Al_6Si_4O_{30} + 17H_2O$.
- Paralaurionite.** Monoclinic; an oxychloride of lead, $PbCl_2 \cdot Pb(OH)_2$.
- Paramelaconite.** Tetragonal; copper oxides, essentially CuO .
- Pearceite.** Silver sulpharsenite, $9Ag_2S \cdot As_2S_3$.
- Penfieldite.** Hexagonal; lead oxychloride, $PbO \cdot 2PbCl_2$.

- Pirssonite.** Orthorhombic; a hydrous calcium and sodium carbonate, $\text{CaCO}_3 \cdot \text{Na}_2\text{CO}_3 \cdot 2\text{H}_2\text{O}$.
- Planoferrite.** Orthorhombic (?); an iron sulphate, $\text{Fe}_2\text{O}_3 \cdot \text{SO}_3 \cdot 15\text{H}_2\text{O}$.
- Proectite.** Monoclinic; a magnesium silicate, probably $\text{Mg}[\text{Mg}(\text{F}, \text{OH})]\text{SiO}_3$.
- Pseudopyrophyllite.** Orthorhombic; $3\text{MgO} \cdot 4\text{Al}_2\text{O}_3 \cdot 9\text{SiO}_2 \cdot 8\text{H}_2\text{O}$. Related to pyrophyllite.
- Pyrophanite.** Rhombohedral; a manganese titanate, MnTiO_3 .
- Quartzine.** Anhydrous fibrous silica.
- Raspite.** Monoclinic; a lead tungstate, PbWO_4 .
- Bathite.** Orthorhombic; contains lead, sulphur, arsenic and antimony.
- Retzian.** Orthorhombic; a basic arsenate of manganese, calcium and undetermined rare metals.
- Rhodolite.** Variety of garnet.
- Rhodusite.** Fibrous; a glaucophane, with Fe_2O_3 replacing Al_2O_3 .
- Roebbingite.** Masses of prismatic crystals; a hydrous calcium and lead silicate, $5\text{H}_2\text{CaSiO}_4 \cdot 2\text{CaPbSO}_4$.
- Rowlandite.** Massive; yttrium silicate, $2\text{Y}_2\text{O}_3 \cdot 3\text{SiO}_2$.
- Salvadorite.** Monoclinic; hydrous iron and copper sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \cdot 2(\text{CuSO}_4 \cdot 7\text{H}_2\text{O})$.
- Sanguinite.** Hexagonal or rhombohedral; a silver sulpharsenite.
- Senaite.** Tri-rhombohedral; oxides of titanium and manganese, $(\text{Fe}, \text{Pb})\text{O} \cdot 2(\text{TiMn})\text{O}_2(?)$.
- Siderotil.** Groups of divergent needles; iron sulphate, $\text{FeSO}_4 \cdot 5\text{H}_2\text{O}$.
- Snarumite.** Massive; mainly aluminium silicate.
- Stibiotantalite.** Tantaloniobate of antimony, $\text{Sb}(\text{TaNb})\text{O}_4$.
- Sulphoborite.** Orthorhombic; a hydrous magnesium sulphate and borate, $3\text{MgSO}_4 \cdot 2\text{Mg}_2\text{B}_4\text{O}_{10} \cdot 12\text{H}_2\text{O}$.
- Svabite.** Hexagonal; a hydrous calcium arsenate, perhaps $\text{H}_2\text{O} \cdot 10\text{CaO} \cdot 3\text{As}_2\text{O}_5$.
- Sychnodymite.** Isometric; copper and cobalt sulphide, essentially $(\text{Co}, \text{Cu})_4\text{S}_8$.
- Tetragophosphite.** Hydrous aluminium, iron, manganese, magnesium and calcium phosphate, $[(\text{Fe}, \text{Mn}, \text{Mg}, \text{Ca})\text{O}]_3\text{P}_2\text{O}_5 \cdot (\text{Al}_2\text{O}_3)\text{P}_2\text{O}_5 + 3\text{H}_2\text{O}$.
- Thalenite.** Monoclinic; a yttrium silicate, $2\text{Y}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$.
- Tilasite.** Granular; a calcium and magnesium fluo-arsenate, $(\text{CaF})\text{MgAsO}_4$.
- Tripuyite.** Micro-crystalline aggregates; an iron antimonate, $2\text{FeO} \cdot \text{Sb}_2\text{O}_5$.
- Umangite.** Massive; copper selenide, $\text{CuSe} \cdot \text{Cu}_2\text{Se}$.
- Urbanite.** Monoclinic; essentially an iron and sodium metasilicate, $(\text{CaMg})\text{SiO}_3 + 2\text{NaFe}(\text{SiO}_3)_2$.
- Valleite.** Orthorhombic; a magnesium, calcium, iron and manganese silicate.
- Wardite.** Massive; a hydrous basic aluminium phosphate, $2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 4\text{H}_2\text{O}$.
- Wellsite.** Monoclinic; a hydrous aluminium, barium, strontium, calcium, magnesium, potassium and sodium silicate, perhaps $\text{RAl}_2\text{Si}_5\text{O}_{16} \cdot 3\text{H}_2\text{O}$.
- Willyamite.** Cobalt and nickel sulphantimonide, $(\text{NiCo})\text{S}(\text{CoNi})\text{Sb}$. Near ullmannite.
- Zirkelite.** Isometric; a calcium zirconate and titanate, $(\text{CaFe})\text{O} \cdot 2(\text{Zr}, \text{Ti}, \text{Th})\text{O}_3$.

METALLIC CLASSIFICATION OF MINERALS.

Showing the Various Combinations in Which the Metals
Occur in Nature.

Under each metal, with its salts as sub-headings, are mentioned the mineral species in which it is a constituent. Several elements which are acidic in character, but commercially important, are included.

The common metals, Aluminium, Calcium, Copper, Iron, Lead, Magnesium, Manganese, Potassium, and Sodium; (also Phosphorus,) are found in a great number and variety of minerals. In this list, species containing less than ten per cent. of one of these metals do not appear under its heading, although they may appear under other metals. Varieties and doubtful species are not enumerated under the common metals.

Under the less commonly occurring metals are given all minerals containing five per cent.; under the rare or precious metals, a fraction of one per cent.

Minerals containing but one basic element are printed in *italics*. They are given first position following the sub-headings, and are arranged in order of the per cent. of metal they carry. Here are included Sulphantimonides, etc.; Niobates, Tantalates; Phosphates, Arsenates, etc., etc., in which Antimony, etc., are acidic. Under the heavy type headings of these elements will also be found again those minerals into which they enter.

Under these acidic sub-headings, *e. g.*, "Arsenates of Metals," minerals having but the one acid are printed in *italics*.

Minerals containing more than one basic element (or under acidic headings more than one acid), are printed in ordinary brevier, following the simpler compounds in *italics*, and are arranged in order of the per cent. of metal (or acid) contained. The names of complex compounds are repeated under the headings of the various elements contained.

Aluminium (Al) 27.

Minerals containing less than 10% pure Aluminium are omitted.

Arsenate. *Durangite*, *Liskeardite*.

Borate. *Jeremejevite*, *Rhodizite*.

Carbonate. *Dawsonite*.

Double Salts. *Topaz*, *Svanbergite*, *Amblygonite*, *Sodalite*, *Lepidolite*, *Ardenite*, *Zinnwaldite*, *Cirrolite*, *Hamlinite*.

Fluoride. *Fluellite*, *Ralstonite*, *Prosopite*, *Chiolite*, *Gearsukite*, *Thomsonolite*, *Cryolite*, *Pachnolite*.

Oxide. *Corundum*, *Diaspore*, *Bauxite*, *Gibbsite*, *Chrysoberyl*, *Spinel*, *Gahnite*, *Zincaluminite*, *Tavistockite*, *Hydrotaelite*.

Phosphate. *Turquoise*, *Sphaerite*, *Pegannite*, *Fischerite*, *Wardite*, *Evansite*, *Wavelite*, *Variscite*, *Callainite*, *Zepharovichite*, *Goyazite*, *Lazulite*, *Plumbogummite*, *Eosphorite*, *Kehoeite*, *Childrenite*.

Silicate. *Dunortierite*, *Andalusite*, *Sillimanite*, *Zunyite*, *Cyanite*, *Schrotterite*, *Collyrite*, *Allophane*, *Kaolinite*, *Halloysite*, *Newtonite*, *Pyrophyllite*, *Cimolite*, *Montmorillonite*, *Sapphirine*, *Margarite*, *Staurolite*, *Körnerupine*, *Xanthophyllite*, *Rumppite*, *Seybertite*, *Paragonite*, *Eucryptite*, *Zoisite*, *Muscovite*, *Anorthite*, *Meionite*, *Euclase*, *Tourmaline*, *Ottrelite*, *Hydronephelite*, *Nephelite*, *Iolite*, *Kaliophyllite*, *Thomsonite*, *Carpholite*, *Labradorite*, *Microsommitite*, *Gismondite*, *Wernerite*, *Cancrinite*, *Hauynite*, *Andesine*, *Spodumene*, *Noselite*, *Lazurite*, *Epidote*, *Natrolite*, *Lepidolite*, *Corundophyllite*, *Gehlenite*, *Scolecite*, *Mesolite*, *Jadeite*, *Phehnite*, *Oligoclase*, *Leucite*, *Sarcolite*, *Analcite*, *Mizzonite*, *Hyalophane*, *Laumontite*, *Levynite*, *Daphnite*, *Anorthoclase*, *Garnet*, *Aphrosiderite*, *Prochlorite*, *Edingtonite*, *Gmelinite*, *Lawsonite*, *Chabazite*, *Phillipsite*, *Albite*, *Partschinite*, *Marialite*, *Orthoclase*, *Microcline*, *Beryl*, *Offérite*, *Wellsite*, *Bliabergite*, *Caswellite*, *Hydrobucholite*.

Sulphate. *Felsobanyite*, *Alumian*, *Paraluminite*, *Aluminite*, *Alunogen*, *Fuggerite*, *Alunite*.

Antimony (Sb) 120.

Arsenide. *Allemontite*, *Antimonial Arsenic*.

Double Salts. *Kermesite*, *Kylindrite*.

Antimonates of Metals. *Romeite*, *Atopite*, *Bindheimite*, *Monimolite*, *Magnetostibian*, *Manganostibiite*, *Lewisite*, *Nadorite*, *Melanostibian*, *Ochlorite*, *Långbanite*.

Antimonides of Metals. *Breithauptite*, *Horsfordite*, *Dyscrasite*, *Willyamite*, *Ullmannite*, *Corynite*, *Wolfachite*.

Antimonites of Metals. *Mauzeliite*, *Falkenhaynrite*.

Native. *Pure Antimony*.

Oxide. *Senarmonite*, *Valentinite*, *Ceryanite*, *Stibiconite*, *Chondrostibian*, *Basilite*.

Sulphide. *Stibnite*, *Guejarite*, *Berthierite*, *Livingstonite*, *Chalcostibite*, *Zinkenite*, *Miargyrite*, *Plagionite*, *Warrenite*, *Stylotipite*, *Jamesonite*, *Brongniardite*, *Semseyite*, *Andorite*, *Famatinite*, *Diaphorite*, *Freieslebenite*, *Bourbonite*, *Tetrahedrite*, *Boulangerite*, *Epiboulangerite*, *Pyrostilpnite*, *Pyrrargyrite*, *Meneghinite*, *Geocronite*, *Stephanite*, *Kilbrickenite*, *Polybasite*, *Kobellite*, *Polyargyrite*.

Arsenic (As) 74.9.

Arsenates of Metals. *Berzelite*, *Haidingerite*, *Pharmacolite*, *Brandtite*, *Roselite*, *Scorodite*, *Carminite*, *Wapplerite*, *Carynite*, *Forbesite*, *Trichaleite*, *Svalite*, *Cabrerite*, *Symplectite*, *Annabergite*, *Sjögrurite*, *Chenevixite*, *Kottigite*, *Mixite*, *Uranospinite*, *Zeunerite*, *Trögerite*, *Atelestite*, *Walpurgite*, *Trippkeite*, *Durangite*, *Picropharmacolite*, *Arseniopleite*, *Conichaleite*, *Mazapilite*, *Leucochalcite*, *Sarkinite*, *Pharmacosiderite*, *Olivinite*, *Adamite*, *Arsenosiderite*, *Adelite*, *Brandtite*, *Erinite*, *Lindackerite*, *Tilasite*, *Cornwallite*, *Euchroite*, *Chondrasenite*, *Bayldonite*, *Lossenite*, *Hemafibrite*, *Flinkite*, *Pitticite*, *Clinoclasite*, *Liroconite*, *Tyrolite*, *Allactite*, *Synadelphite*, *Liskeardite*, *Hematolite*, *Mimetite*, *Chalcophyllite*, *Rhagite*, *Ecdemite*, *Veszelyite*, *Rhodarsenian*.

Arsenides of Metals. *Skutterudite*, *Safflorite*, *Chloanthite*, *Rammelsbergite*, *Smaltite*, *Löllingite*, *Allemontite*, *Niccolite*, *Sperryite*, *Domeykite*, *Algodonite*, *Whitneyite*, *Cobaltite*, *Arsenopyrite*, *Glaucodot*, *Gersdorffite*, *Lorandite*, *Corynite*, *Wolfachite*, *Alloclasite*, *Rittingerite*.

Native. *Pure Arsenic*, *Arsenolamprite*.

Oxide. *Arsenolite*, *Claudetite*.

Sulphide. *Realgar*, *Orpiment*, *Binnite*, *Sartorite*, *Dufrenoyite*, *Enargite*, *Tennantite*, *Proustite*, *Güiternanite*, *Xanthoconite*, *Jordanite*, *Epigenite*.

Barium (Ba) 137.

Carbonate. *Witherite*, *Bromilite*, *Barytocalcite*.

Double Salt. *Cappelenite*.

Nitrate. *Nitrobarite*.

Phosphate. *Uranocircite*.

Silicate. *Edingtonite*, *Harmotome*, *Hyalotekite*, *Wellsite*, *Hyalophane*, *Brewsterite*.

Sulphate. *Barite*.

Beryllium (Be or Gl) 9.1.**Aluminate.** *Chrysoberyl.***Double Salt.** *Hamborgite.***Phosphate.** *Beryllonite, Herderite, Hamlinite.***Silicate.** *Phenacite, Bertrandite, Euclase, Trimerite, Beryl, Helvite, Danalite, Epididymite, Leucophanite, Gadolinite.***Bismuth (Bi) 207.5.****Alloys.** *Bismuth-Gold, Alloclasite, Chilenite, Bismuth-Silver.***Arsenate.** *Atlestite, Rhagite, Walpurgite, Mixite.***Carbonate.** *Bismutosphærite, Bismutite.***Double Salts.** *Daubréeite, Tapalpate.***Native.** *Pure Bismuth.***Oxide.** *Bismite, Montanite.***Selenide.** *Guanajuatite.***Silicate.** *Eulytite, Agricolite.***Sulphide.** *Bismuthinite, Cuprobismutite, Chiviatite, Emplectite, Rezbanyite, Galenobismutite, Matildite, Klaprotholite, Schirmerite, Cosalite, Schapbachite, Wittichenite, Aikinite, Grünauite, Kobellite, Beegerite, Lillianite.***Telluride.** *Tetradymite, Joseite, Wehrlite.***Uranate.** *Uranosphærite.***Vanadate.** *Pucherite.***Boron (B) 10.9.****Borates of Metals.** *Larderellite, Hydroboracite, Heintzite, Bechilite, Colemanite, Lagonite, Primoite, Ulexite, Jeremejevite, Hamborgite, Szaibelyite, Borax, Susserite, Rhodizite, Boracite, Howlite, Warwickite, Nordenskiöldine, Homilite, Capelenite, Pinakiolite, Tourmaline, Axinite, Sulfoborite.***Oxide.** *Sassolite.***Silicate.** *Danburite, Datolite.***Cadmium (Cd) 111.7.****Sulphide.** *Greenockite, sometimes Sphalerite and Smithsonite.***Cæsium (Cs) 58.7.****Borate.** *Rhodizite.***Silicate.** *Pollucite.***Calcium (Ca) 39.9.**

Minerals containing less than 10% pure Calcium are omitted.

Antimonate. *Atopite, Romeite.***Arsenate.** *Haidingerite, Pharmacolite, Scabite, Conichalcite, Wapplerite, Roselite, Pieropharmacolite, Adelite, Brandtite, Berzeliite, Mazapilite, Caryinite.***Borate.** *Colemanite, Bechilite, Nordenskiöldine, Ulexite.***Carbonate.** *Calcite, Aragonite, Hydrocalcite, Dolomite, Pirssonite, Cuprocalcite, Ankerite, Bromlite, Barytocalcite.***Chloride.** *Hydrophyllite.***Double Salts.** *Cuspidine, Apatite, Spodiosite, Homilite, Howlite, Titanite, Guarinite, Thaumassite, Mauzeilite, Dahllite, Herderite, Dysanallyte, Nocerite, Hiortdahlite, Rhodarsenian, Schorlomite, Meliphanite, Tilasite, Leucophanite, Wöhlerite, Keilhauite, Axinite, Cenosite, Dietzeite, Pyrochlore, Rinkite.***Fluoride.** *Fluorite, Gearsutite, Thomsenolite, Pachnolite, Prosopite.***Iodate.** *Lautarite.***Molybdate.** *Powellite.***Niobate.** *Koppite.***Nitrate.** *Nitrocalcite.***Phosphate.** *Monetite, Collophanite, Isoclastite, Martinite, Metabrushite, Brushite, Tavistockite, Fairfieldite, Messelite, Cirrolite, Goyazite, Calcioferrite.***Silicate.** *Wollastonite, Gyrolite, Okenite, Gehlenite, Grossularite, Monticellite, Vesuvianite, Datolite, Pectolite, Harstigitite, Sarcolite, Uvarovite, Melilite, Andradite, Homilite, Schorlomite, Prehnite, Meionite, Zoisite, Apophyllite, Epidote, Pyroxene, Danburite, Piedmontite, Babingtonite, Anorthite, Laubauite, Gismondite, Scolecite, Margarite, Lawsonite, Astochite, Caswellite.***Sulphate.** *Anhydrite, Gypsum, Ettringite, Glauberite, Polyhalite, Syngenite, Wattevilleite, Fuggerite.***Sulphide.** *Oldhamite.***Tantalate.** *Microlite.***Titanate.** *Perovskite.***Tungstate.** *Scheelite.***Vanadate.** *Calciovolborthite.***Carbon (C) 12.****Native.** *Diamond, Graphite.* Coal and other Hydrocarbons.**Carbonates of Metals.** About forty mineral species, enumerated under the sub-headings, "Carbonates," following metal-headings.**Cerium (Ce) 141.****Double Salts.** *Fluocerite, Parisite, Bastnäsité, Melanocerite, Tritomite, Caryocerite, Æschynite, Tscheffkinite, Rinkite, Fergusonite, Polymignite, Samarskite.***Fluoride.** *Tysonite, Yttrocerite.***Niobate.** *Pyrochlore.***Phosphate.** *Churchite, Monazite.***Silicate.** *Cerite, Mosandrite, Johnstrupite, Allanite.***Chromium (Cr) 52.5.****Chromates of Metals.** *Crocoite, Phoenicochroite, Dietzeite, Vauquelinite.***Oxide.** *Chromite.***Silicate.** *Uvarovite.***Sulphide.** *Daubreelite.*

Cobalt (Co) 58.7.

- Arsenate.** *Erythrite*, *Roselite*, *Forbesite*.
Arsenide. *Smaltite*, *Skutterudite*, *Safflorite*, *Nickel-skutterudite*.
Carbonate. *Sphaerocobaltite*, *Remingtonite*.
Double Salts. *Cobaltite*, *Glauco-dot*, *Alloclasite*, *Willyamite*.
Oxide. *Asbolite*, *Heterogenite*, *Heubachite*.
Sulphate. *Bieberite*.
Sulphide. *Linneite*, *Carrollite*.

Copper (Cu) 63.2.

Minerals containing less than 10% pure Copper are omitted.

- Antimonide.** *Horsfordite*.
Arsenide. *Whitneyite*, *Algodonite*, *Domeykite*.
Arsenate. *Clinoclase*, *Erinite*, *Cornwallite*, *Olivinite*, *Chalcophyllite*, *Tyrolite*, *Euchroite*, *Trichalcite*, *Trippkeite*, *Leucochalcite*, *Mixite*, *Liroconite*, *Conichalcite*, *Chenevixite*.
Carbonate. *Malachite*, *Azurite*, *Cuprocaltite*, *Aurichalcite*.
Chloride. *Nantokite*, *Atacamite*.
Double Salts. *Connellite*, *Tennantite*, *Tetrahedrite*, *Enargite*, *Melanothallite*, *Fumatite*, *Footite*, *Wittichenite*, *Antlerite*, *Fulkenhamite*, *Kamarezeite*, *Binnite*, *Chalcostibite*, *Klaprotholite*, *Emplectite*, *Guejarite*, *Cuprobismutite*, *Spangolite*, *Epigenite*, *Bolite*, *Veszelyite*, *Stylo-type*, *Lindackerite*, *Rivotite*, *Percylite*, *Bour-nonite*, *Aikinite*.
Iodide. *Cupriodargyrite*.
Native. *Pure Copper*.
Nitrate. *Gerhardtite*.
Oxide. *Pharmelaconite*, *Melaconite*, *Cuprite*, *Tenorite*, *Crednerite*, *Cumengite*.
Phosphate. *Pseudomalachite*, *Dihydrite*, *Libethenite*, *Tagilite*, *Torbernite*.
Selenite. *Chalcomenite*.
Selenide. *Umangite*, *Berzelianite*, *Crookesite*, *Eucalrite*, *Zorgite*.
Silicate. *Diopside*, *Chrysocolla*.
Sulphate. *Brochantite*, *Langite*, *Dolero-phomite*, *Arnimite*, *Hydrocyanite*, *Herren-grundite*, *Chalcanthite*, *Cyanotrichite*, *Salvadorite*, *Kröhnkite*, *Linarite*, *Cyano-chroite*, *Serpierite*.
Sulphide. *Chalcocite*, *Harrisite*, *Covellite*, *Tennantite*, *Bornite*, *Chalcopyrite*, *Sychnodymite*, *Stromeyerite*, *Stannite*, *Cubanite*, *Carrollite*.
Tungstate. *Cuprotungstite*.
Vanadate. *Calciovolborthite*, *Volborthite*, *Psittacinite*, *Mottrammitte*.

Didymium (Di) 142.

- Borate.** *Caryocerite*.

- Double Salts.** *Bastnäsité*, *Fluocerite*, *Melanocerite*, *Tritomite*, *Æschynite*, *Polymignite*, *Weibyeite*, *Erdmannite*, *Wasite*, *Samarskite*.
Fluoride. *Tysonite*, *Yttrocerite*.
Phosphate. *Rhabdophanite*, *Monazite*.
Silicate. *Steenstrupine*.

Erbium (Er) 166.

- Double Salts.** *Fluocerite*, *Fergusonite*, *Euxenite*, *Polycrase*, *Yttrotantalite*, *Cyrtolite*, *Nohlite*.
Fluoride. *Yttrocerite*.
Niobate. *Sipylite*.
Phosphate. *Rhabdophanite*, *Scovillite*.
Silicate. *Cenosite*, *Eucrasite*.

Germanium (Ge) 73.3.

- Sulphide.** *Argyrodite*, *Canfieldite*.

Gold (Au) 196.7.

- Alloys.** *Palladium-Gold*, *Bismuth-Gold*, *Electrum*, *Gold Amalgam*, *Küstelite*.
Double Salt. *Nagyagite*.
Native. *Gold*, generally alloyed.
Telluride. *Calaverite*, *Krennerite*, *Sylvanite*, *Müllérine*, *Petzite*.

Iridium (Ir) 192.5.

- Alloy.** *Iridosmine*.
Native. *Iridium*, alloyed with other metals.

Iron (Fe) 55.9.

Minerals containing less than 10% pure Iron are omitted.

- Aluminate.** *Hercynite*.
Antimonate. *Magnetostibian*, *Långbanite*, *Melanostibian*.
Arsenate. *Pharmacosiderite*, *Symplexite*, *Scorodite*, *Arsenosiderite*, *Carminite*, *Mazapillite*, *Chenevixite*.
Arsenide. *Löllingite*, *Leucopyrite*.
Borate. *Lagonite*.
Carbonate. *Siderite*, *Mesitite*, *Ankerite*.
Chloride. *Lawrencite*, *Molybite*, *Kremersite*, *Douglasite*, *Erythrosiderite*.
Chromate. *Chromite*.
Double Salts. *Pitticite*, *Diadochite*, *Arsenopyrite*, *Tapiolite*, *Ænigmatite*, *Beudantite*, *Lossenite*, *Pyrosomalite*, *Danaite*, *Triplite*, *Schorlomite*, *Homilite*, *Partschinite*, *Glauco-dot*.
Native. *Terrestrial Iron*, *Meteorite Iron*, (always containing nickel and other elements).
Niobate. *Columbite*.
Oxide. *Hematite*, *Martite*, *Magnetite*, *Turgite*, *Göthite*, *Limonite*, *Xanthosiderite*, *Magnesiöferrite*, *Plumboferrite*, *Manganoferrite*, *Franklinite*, *Jacobsite*, *Ilmenite*, *Ludwigite*, *Pyroaurite*, *Chondrostibian*.
Phosphate. *Dufrenite*, *Ludlamite*, *Ber-aunite*, *Vivianite*, *Cacozenite*, *Phosphosid-*

erite, Strengite, Borickite, Chalcosiderite, Triphylite, Koninckite, Childrenite, Barrandite, Calcioferrite, Triploidite, Messelite, Dickinsonite, Lithiophilite.

Silicate. *Cronstedtite, Fayalite, Hoeferite, Hisingerite, Chloropal, Ilvaite, Thuringite, Aphrosiderite, Almandite, Crocidolite, Riebeckite, Arfvedsonite, Stilpnomelane, Daphnite, Knebelite, Røpperite, Acmite, Lepidomelane, Strigonalite, Andradite, Chrysolite, Prochlorite, Diabantite, Astrophyllite, Chloritoid, Melanotekite, Babingtonite, Delessite, Caledonite, Biotite, Glaucosite, Neotocite, Ottrelite, Epidote, Allanite, Staurolite, Piedmontite, Anthophyllite, Diopside, Hypersthene, Crossite, Ransatite, Bliabergite, Caswellite.*

Sulphate. *Glockerite, Utahite, Carphosiderite, Raimondite, Amaranthite, Fibroferrite, Costantite, Copiapite, Melanterite, Coquimbite, Quenstedtite, Römerite, Idite, Cyprusite, Jarosite, Voltaite, Metavoltine, Quentenite, Sideronatrite, Knoxvilleite, Botryogen, Ferronatrite.*

Sulphide. *Troilite, Pyrrhotite, Pyrite, Marcasite, Pentlandite, Cubanite, Folgerite, Sternbergite, Chalcopyrite, Blueite, Daubreeite, Bornite, Epigenite, Berthierite, Stannite.*

Tantalate. *Skogbölite, Tantalite.*

Tellurite. *Durdenite, Emmonsite, Ferrotellurite.*

Tungstate. *Reinitite, Wolframite.*

Lanthanum (La) 138.

Carbonate. *Lanthanite.*

Double Salts. *Kischtimite, Bastnäsite, Fluocerite, Tritomite, Caryocerite, Melanocerite, Weibyeite, Erdmannite, Polymignite, Æschynite, Samarskite.*

Fluoride. *Tysonite.*

Phosphate. *Rhabdophanite, Monazite, Kärarfveite, Scovillite.*

Silicate. *Bodenite, Steenstrupine, Wasite, Muromontite.*

Lead (Pb) 206.4.

Minerals containing less than 10% pure Lead are omitted.

Antimonate. *Bindheimite, Monimolite.*

Arsenate. *Bayldonite, Carminite.*

Carbonate. *Hydrocerussite, Cerussite.*

Chloride. *Laurionite, Paralaurionite, Cotunnite, Cumengite.*

Chromate. *Phenicochroite, Crocoite.*

Double Salts. *Mendipite, Penfieldite, Matlockite, Leadhillite, Eedemite, Phosgenite, Pyromorphite, Vanadinite, Ochrolite, Mimeteite, Geocronite, Endlichite, Schwartzembergite, Nadarite, Daviesite, Fiedlerite, Nagyagite, Boléite, Vauque-*

linite, Lossenite, Percylite, Caracolite, Plumbogummite, Beudantite.

Molybdate. *Wulfenite.*

Native. *Pure Lead.*

Oxide. *Massicot, Minium, Plattnerite, Plumboferrite.*

Selenide. *Clausthalite, Lehrbachite, Zorgite.*

Silicate. *Barysilite, Ganomalite, Kentrolite, Melanotekite, Hyalotekite.*

Sulphate. *Lanarkite, Anglesite, Caledonite, Linarite, Lössenite.*

Sulphide. *Galenite, Jordanite, Kilbrickenite, Guitermanite, Meneghinite, Beegerite, Boulangerite, Dufrenoyite, Epiboulangerite, Semseyite, Jamesonite, Sartorite, Lillianite, Bournonite, Cosalite, Plagionite, Kobellite, Warrenite, Zinkenite, Diaphorite, Freieslebenite, Aikinite, Galenobismutite, Brongniardite, Schapbachite, Rezbanyite, Chiviatite, Schirmerite, Andorite.*

Telluride. *Altaite.*

Tungstate. *Stolzite.*

Uranate. *Uraninite.*

Vanadate. *Brackebuschite, Descloizite, Psittacinite.*

Lithium (Li) 7.

Double Salts. *Amblygonite, Lepidolite, Zinnwaldite.*

Phosphate. *Lithiophilite, Triphylite.*

Silicate. *Eucryptite, Spodumene, Petalite.*

Magnesium (Mg) 24.

Minerals containing less than 10% pure Magnesium are omitted.

Arsenate. *Hoernesite, Berzeliite, Cabrerite, Roselite, Caryinite, Picropharmacolite, Adelite.*

Borate. *Szaibelyite, Ascharite, Pinnoite, Ludwigite, Sussexite, Heintzite.*

Carbonate. *Magnesite, Hydrogiobertite, Hydromagnesite, Nesquehonite, Langfordite, Mesitite, Dolomite, Northupite.*

Chloride. *Chloromagnesite, Bischofite, Carnallite, Tachhydrite.*

Double Salts. *Wagnerite, Sulfoborite, Lüneburgite, Humite, Chondrodite, Clinohumite, Warwickite, Nocerite, Boracite, Pinakiolite, Phillogopite.*

Fluoride. *Sellaite.*

Molybdate. *Belonesite.*

Nitrate. *Nitromagnesite.*

Oxide. *Periclase, Brucite, Hydrotalcite, Pyroaurite, Spinel, Magnesioferrite.*

Phosphate. *Bobierrite, Newberyite, Hanayite, Struvite, Hautefeullite.*

Silicate. *Forsterite, Serpentine, Enstatite, Deweyite, Talc, Spadaite, Sepiolite, Chrysolite, Clinocllore, Penninite, Saponite, Pholidolite, Anthophyllite, Monticellite, Hypersthene, Amphibole, Biotite,*

Seybertite, Diabantite, Jeffersonite, Delessite, Corundophilite, Xanthophyllite, Sapphirine, Kornerupine, Pyrope, Prochlorite, Genthite, Pyroxene, Caswellite.

Sulphate. *Kieserite, Epsomite, Kainite, Löweite, Blöditte.*

Titanate. *Geikielite.*

Manganese (Mn) 54.8.

Minerals containing less than 10% pure Manganese are omitted.

Antimonate. *Manganostibiite, Magnetostibian, Melanostibian, Basiliite.*

Arsenate. *Allactite, Plinkite, Hemafibrite, Chondrarsenite, Sarkinite, Synadelphite, Sjögruvite, Hematolite, Arseniopleite, Caryinite, Berzeliite, Brandtite.*

Borate. *Sussexite.*

Carbonate. *Rhodochrosite.*

Chloride. *Seacchite.*

Double Salts. *Braunite, Friedelite, Långbanite, Rhodarsenian, Ardennite, Triplite, Pyrosomalite.*

Oxides. *Manganosite, Psilomelane, Pyrochroite, Hausmanite, Pyrolusite, Polianite, Manganite, Chalcophanite, Wad, Manganoferrite, Crednerite, Pinakiolite, Chondrostibian, Jacobsite, Franklinite.*

Phosphate. *Hureaulite, Triploidite, Reddingite, Fillowite, Natrophilite, Lithiophilite, Dickinsonite, Eosphorite, Triphylite, Fairfieldite.*

Silicate. *Tephroite, Bementite, Caryopillite, Rhodonite, Neotocite, Ganophyllite, Inesite, Spessartite, Trimerite, Partschinite, Knebelite, Kentrolite, Carpholite, Røpperite, Piedmontite, Astochite, Harstigte, Ransatite, Caswellite, Bliabergite.*

Sulphate. *Szmkite, Mallardite, Ilesite.*

Sulphide. *Alabandite, Hauerite.*

Tungstate. *Hübnerite, Wolframite.*

Titanate. *Pyrophanite.*

Mercury (Hg) 199.8.

Alloy. *Amalgam.*

Antimonate. *Barcenite.*

Chloride. *Calomel.*

Double Salt. *Onofrite.*

Native. *Pure Mercury.*

Selenide. *Tiemannite, Lehrbachite.*

Sulphide. *Cinnabar, Metacinnabarite, Livingstonite.*

Tellurate. *Magnolite.*

Telluride. *Coloradoite.*

Molybdenum (Mo) 96.

Molybdates of Metals. *Belonesite, Powellite, Wulfenite.*

Oxide. *Molybdite.*

Sulphide. *Molybdenite.*

Nickel (Ni) 58.6.

Antimonide. *Breithauptite.*

Arsenate. *Annabergite, Cabrerite, Forbesite, Lindackerite.*

Arsenide. *Nicolite, Rammelsbergite, Chloanthite, Nickel-skutterudite.*

Carbonate. *Zaratite.*

Double Salts. *Gersdorffite, Wofschite, Kallilite, Corymbite, Ullmannite, Willyamite.*

Native. *Nickel alloyed with iron.*

Oxide. *Bunsenite.*

Silicate. *Connarite, Genthite, Garnierite.*

Sulphate. *Morenosite.*

Sulphide. *Millerite, Beyrichite, Polydymite, Siegenite, Pentlandite, Folgerite, Blueite, Pyrrhotite.*

Telluride. *Melomite.*

Niobium (Nb) 93.7.

Niobates of Metals. *Koppite, Annervilleite, Sipplite, Columbite, Tantalite, Pyrochlore, Samarskite, Fergusonite, Euxenite, Hatchettolite, Aeschynite, Polycrase, Dysanalyte, Hielmite, Wöhlerite, Polymignite, Yttrotantalite, Tapolite, Microlite.*

Osmium (Os) 191.

Alloy. *Iridosmine.*

Sulphide. *Laurite.*

Oxide. *Irite.*

Palladium (Pd) 106.2.

Native. *Palladium, alloyed with other metals.*

Phosphorus (Ph) 31.

Minerals containing less than 10% pure Phosphorus are omitted.

Phosphates of Metals. *Beryllonite, Monetite, Martinite, Lithiophilite, Hannayite, Metabrushite, Variscite, Triphylite, Lazulite, Collinite, Brushite, Cörolite, Natrophylite, Collophanite, Fillowite, Barandite, Dickinsonite, Phosphosiderite, Xenotime, Hureaulite, Fairfieldite, Meschite, Strengite, Zepharovichite, Stercorite, Wavellite, Reddingite, Kinnickite, Hopeite, Calcioferrite, Triploidite, Childrevite, Eosphorite, Pegamite, Isoclasite, Lindamite, Turquoise, Beraunite, Fischerite, Tavistockite, Struvite, Libethenite, Monazite, Vivianite, Churchite, Sphärite, Rhodophanite, Tagilite, Pseudomalachite, Amblygonite, Herderite, Apatite, Dahlite, Triplite, Spodiosite, Chalcosiderite, Dufrenite.*

Platinum (Pt) 194.3.

Platinum Arsenide. *Sperryite.*

Native. *Platinum, alloyed with other metals.*

Potassium (K) 39.

Minerals containing less than 10% pure Potassium are omitted.

Borate. Rhodizite, Heintzite.

Chloride. *Sylvite*, Douglasite, Erythrosiderite, Kainite, Carnallite, Kremersite.

Fluoride. Hieratite.

Nitrate. *Niter*.

Silicate. Astochite, Leucite, Orthoclase, Microcline, Lepidolite, Hyalophane.

Sulphate. *Misenite*, Taylorite, Aphthitalite, Syngenite, Picromerite, Cyanochoite, Polyhalite.

Rubidium (Rb) 85.2.

Borate. Rhodizite.

Ruthenium (Ru) 103.5.

Sulphide. *Laurite*.

Selenium (Se) 78.9.

Native. Selen-Tellurium, Selenosulphur.

Selenides of Metals. *Berzelianite*, *Umanigite*, *Guanajuatite*, *Eucairite*, *Zorgite*, *Crookesite*, *Clausthalite*, *Tiemannite*, *Naumannite*, *Lehrbachite*, *Rittingerite*, *Aguilarite*, *Onofrite*.

Selenite of Metals. *Chalcomenite*.

Silicon (Si) 28.

Oxides. *Quartz*, *Tridymite*, *Opal*.

Silicates of Metals. A large number of mineral species are included in this class. They are enumerated under the sub-headings "Silicates," following the different metal-headings.

Silver (Ag) 107.7.

Alloy. Chilenite, Kuestelite, Electrum.

Antimonide. *Dyscrasite*, *Animikite*.

Arsenide. *Arsenargentite*, *Huntelite*.

Bromide. *Bromyrite*.

Carbonate. *Selbite*.

Chloride. *Cerargyrite*, *Bordosite*, *Bolélite*, *Huantajayite*.

Double Salts. *Polyargyrite*, *Aguilarite*, *Polybasite*, *Argyrodite*, *Stephanite*, *Proustite*, *Xanthoconite*, *Embolite*, *Sanguinite*, *Pyrargyrite*, *Iodobromite*, *Pyrostilpmite*, *Rittingerite*, *Miargyrite*, *Matildite*, *Plenargyrite*, *Canfieldite*, *Tapalpita*, *Brongniardite*, *Freieslebenite*, *Diaphorite*, *Schirmerite*, *Schapbachite*, *Stylopyrite*, *Dürfeldtite*, *Polytelite*.

Iodide. *Iodyrite*, *Tocornalite*, *Cupriodargyrite*.

Native. *Pure Silver*, *Cupriferous Silver*.

Selenide. *Naumannite*, *Eucairite*, *Crookesite*.

Sulphide. *Argentite*, *Acanthite*, *Daleminzite*, *Jalpaite*, *Stromeyerite*, *Sternbergite*, *Andorite*, *Frieseite*, *Castillite*, *Richmondite*.

Telluride. *Stützite*, *Hessite*, *Petzite*, *Krennerite*, *Sylvanite*, *Müllérine*, *Calaverite*.

Sodium (Na) 23.

Minerals containing less than 10% pure Sodium are omitted.

Borate. *Borax*.

Carbonate. *Thermonatrite*, *Trona*, *Natron*, *Dawsonite*, *Gay-Lussite*, *Pirssonite*.

Chloride. *Halite*.

Double Salts. *Sulphohalite*, *Hanksite*, *Nitroglauberite*, *Darapskite*, *Northupite*, *Noselite*, *Cancrinite*, *Hauynite*, *Mari-alite*, *Eudialyte*, *Lazurite*.

Fluoride. *Cryolite*, *Chiolite*, *Pachnolite*, *Thomsenolite*.

Nitrate. *Soda Niter*.

Phosphate. *Beryllonite*, *Natrophilite*, *Stercorite*.

Silicate. *Sodalite*, *Natrolite*, *Jadeite*, *Nephelite*, *Hydronephelite*, *Analcite*, *Albite*, *Acmite*, *Eudidymite*, *Astochite*.

Sulphate. *Thenardite*, *Mirabilite*, *Glauberite*, *Loweite*, *Blödite*, *Kröhnkite*, *Ferronatrite*, *Lecontite*, *Caracolite*, *Sidronatrite*.

Strontium (Sr) 87.3.

Carbonate. *Strontianite*.

Silicate. *Brewsterite*.

Sulphate. *Celestite*.

Sulphur (S) 32.

Native. *Sulphur*, *Selensulphur*.

Sulphides, Sulphates, etc., include many minerals. They are given under the different metals.

Tantalum (Ta) 182.

Tantalates of Metals. *Tapiolite*, *Skogbolite*, *Tantalite*, *Microlite*, *Hielmite*, *Yttrotantalite*, *Hatchettolite*, *Samaraskite*, *Fergusonite*, *Columbite*.

Tellurium (Te) 125.

Alloys. Selen-tellurium, *Tetradymite*, *Wehrlite*, *Joséite*.

Native. Tellurium, alloyed with other metals.

Oxide. *Tellurite*.

Tellurates of Metals. *Montanite*.

Tellurides of Metals. *Sylvanite*, *Krennerite*, *Calaverite*, *Coloradoite*, *Allaite*, *Hessite*, *Petzite*, *Stützite*, *Tapalpita*, *Nagyagite*.

Tellurites of Metals. *Emmonsite*, *Durdenite*.

Thallium (Tl) 203.7.

Double Salt. *Lorandite*.

Selenide. *Crookesite*.

Thorium (Th) 232.

Double Salts. *Auerite*, Calciorthorite, Eucrasite, Caryocerite, Tritomite, Freyalite, Polymignite, Koehelite.

Oxide. Mackintoshite.

Silicate. *Orangeite*, *Thorite*, Yttrialite, Steenstrupine, (Monazite Sand.)

Thorates of Metals. Thorogummite, Æschynite, Pyrochlore.

Uranate. Uraninite.

Tin (Sn) 117.4.

Borate. Nordenskiöldine.

Native. *Pure Tin*.

Oxide. *Cassiterite*.

Stannates of Metals. Kylvindrite, Canfieldite, Hielmite.

Sulphide. Stannite.

Titanium (Ti) 48.

Borate. Warwickite.

Oxide. *Rutile*, *Brookite*, *Anatase*, Senaite, Ilmenite, Pseudobrookite.

Silicate. *Astrophyllite*.

Titanates of Metals. *Geikielite*, *Pyrophanite*, *Perovskite*, Dysanallyte, Titanite, Guarinite, Polycrase, Keilhauite, Euxenite, Warwickite, Schorlomite, Æschynite, Lewisite, Neptunite, Polymignite, Pyrochlore, Ænigmatite, Mauzeilite.

Tungsten (W) 183.6.

Oxide. *Tungstite*, *Weymacite*.

Tungstates of Metals. *Scheelite*, *Wolframite*, *Reinite*, *Hübnerite*, *Cuprotungstite*, *Stolzite*, *Powellite*.

Uranium (U) 240.

Arsenate. Trögerite, Uranospinite, Zennerite, Walpurgite.

Carbonate. Volgite, Uranothallite, Liebigite.

Double Salts. Hatchettolite, Samarskite, Euxenite, Polycrase.

Niobate. Ännerödite.

Oxide. Mackintoshite.

Phosphate. *Phosphuranylite*, Autunite, Torbernite, Uranocircite.

Silicate. Uranophane.

Sulphate. Uranopilite, Johannite.

Uranates of Metals. *Uraninite*, *Uranosphærite*.

Altered Minerals, containing Uranium. Gummite, Thorogummite, Yttrogummite.

Vanadium (V) 51.1.

Silicate. Roscoelite.

Vanadates of Metals. *Calciovolborthite*, *Pucherite*, *Brackebuschite*, *Descloizite*, *Psittacinite*, *Volborthite*, Vanadinite, Endlichite, Ardennite.

Yttrium (Y) 89.

Carbonate. *Tengerite*.

Double Salts. Cappelenite, Fergusonite, Polycrase, Euxenite, Yttrotantalite, Samarskite, Melanocerite, Ännerödite, Hielmite.

Fluoride. Yttrocerite.

Phosphate. *Xenotime*.

Silicates. *Thalénite*, *Rowlandite*, Yttrialite, Gadolinite, Cenosite.

Zinc (Zn) 65.1.

Arsenate. *Adamite*, *Köttigite*.

Carbonate. *Hydrozincite*, *Smithsonite*, *Aurichalcite*.

Double Salts. *Voltzite*, *Veselyite*, *Danaite*.

Phosphate. *Kehoeite*.

Native. (doubtful.)

Oxide. *Zincite*, *Gahnite*, *Chalcophanite*, *Franklinite*.

Phosphate. *Hopeite*.

Silicate. *Willemite*, *Calamine*, *Roepperite*.

Sulphate. *Zinkosite*, *Goslarite*, *Zincaluminite*.

Sulphide. *Sphalerite*, *Wurtzite*.

Vanadate. *Descloizite*.

Zirconium (Zr) 90.4.

Double Salts. *Låvenite*, *Rosenbuschite*.

Oxide. *Baddeleyite*.

Silicate. *Zircon*.

Zirconates of Metals. Polymignite, Hiortdahlite, Wöhlerite.

SUPPLEMENT.

Aluminium Silicate. Celsian, Eriomite.

Antimony. Triphuyite, Franckeite.

Arsenic. Bismutosmaltite, Manganberzeliite.

Barium Silicate. Celsian.

Bismuth. *Grünlingite*, Bismutosmaltite.

Chromium. Mitchellite, Beresovite.

Cobalt. Bismutosmaltite.

Gold Tel. Goldschmidtite, Kalgoorlite.

Iron. Sulphide, Gunnarite.

Lead. Beresovite, Nasonite, Franckeite.

Manganese. Glaucochroite, Manganberzeliite.

Nickel Sulphide. Gunnarite.

Silver. Miersite, Kalgoorlite, Goldschmidtite.

Tantalum and Niobium. Mossite.

Tellurium. Goldschmidtite, Kalgoorlite, Grünlingite.

Tin, Double Salt. Franckeite.

Uranium and Vanadium. Carnotite.

Zinc Silicate. Clinohedrite, Hardystonite.

